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THESIS

THREE-DIMENSIONAL FINITE ELEMENT MODEL
OF A HIGH POWER, LOW FREQUENCY
RING-SHELL FLEXTENSIONAL SONAR TRANSDUCER
by

Rogério Nascimento Costa Pinto

December 1992

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Low Frequency Ring-Shell Flextensional Sonar Transducer

by

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B. S., Brazilian Naval Academy, Rio de Janeiro, 1978

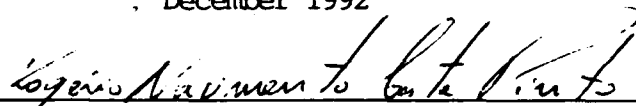
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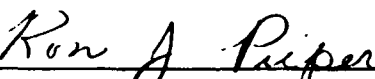


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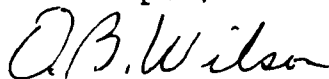
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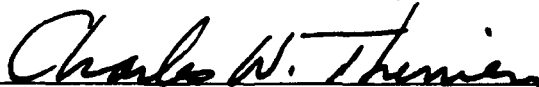
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ABSTRACT

A three-dimensional finite element model of a high power, low frequency ring-shell flextensional transducer (Sparton of Canada, Ltd. Model 34A0610 [Ref. 1]) was developed for use with the ATILA code [Ref. 2]. This transducer model is to be coupled with an analytical acoustic field description in order to model a dense sonar array of US Navy interest [Ref. 3].

The three-dimensional model was derived from a two-dimensional model provided by the Naval Undersea Warfare Center [Ref. 4]. Two types of finite-element analyses were performed using ATILA: (1) an in-air modal analysis, in which the eigenfrequencies and eigenmodes are computed, and (2) an in-water harmonic analysis, in which the pressure field at a desired driving frequency is computed. The frequency of the ring mode computed for the three-dimensional model in the modal analysis was found to be 5 percent higher than the corresponding value for the two-dimensional model. From the harmonic analyses, the maximum sound pressure level on the acoustic axis was found to be 4 dB higher than the manufacturer's measured value and is located at exactly the same frequency.

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I. INTRODUCTION

The direction of active sonar surveillance systems is toward lower frequencies, requiring arrays of large, high power transducers. The successful design and operation of such arrays requires the ability to predict reliably their performance.

To this end, Professor S. R. Baker of the Physics Department, and Professors D. R. Canright and C. L. Scandrett from the Mathematics Department of the Naval Postgraduate School have established a research program with the goal of developing the means to predict the performance of arbitrarily dense, volumetric active sonar arrays [Ref. 3]. The approach used is based on the T-matrix method, which has been successfully applied to solve multiple scattering problems [Ref. 5]. In the present application, the acoustic field external to an arbitrary collection of radiators (here a radiator is a transducer surrounded by fluid to some arbitrary radius) is represented as a superposition of free-space radiation eigenfunctions (spherical harmonics). For each individual radiator a transition matrix, or T-matrix, is computed, which relates the expansion coefficients of outgoing waves to those of incoming waves and the driving

voltage. This requires the results of two harmonic finite element analyses, the free-field radiation problem and the single element scattering problem. Ultimately, the T-matrix of the total configuration, relating the far-field pressure to the driving voltage applied to each element, is obtained in terms of the T-matrix of the individual elements and translation matrices (of the spherical functions) that depend on the distance between and relative orientation of pairs of elements.

This thesis is concerned with the application of the finite-element code "ATILA", developed at the Institut Supérieur d'Electronique du Nord (Lille, France) [Ref. 2] to provide a three-dimensional model of a low frequency flextensional transducer of US Navy interest, the Model 34A0610 "ring-shell" transducer, manufactured by Sparton of Canada, Ltd. [Ref. 1], illustrated in Fig. 1. This transducer was used for proof of principle tests of the so-called "billboard" array concept, which is illustrated in Fig. 2. The results of harmonic radiation and scattering analyses performed using ATILA with the three-dimensional model will be used to generate the single-element T-matrix for this transducer, and so enable the billboard array to be modeled using the modified T-matrix method. The solution of the radiation problem is described in this thesis. The solution of the scattering problem can not be performed at this time. It will be performed using the same three-dimensional model as

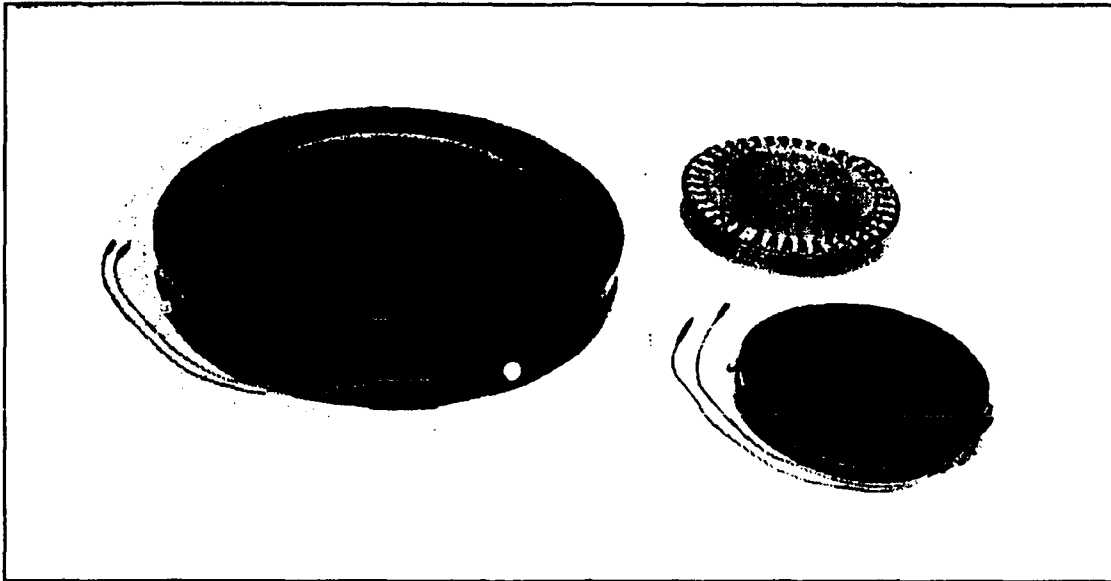


Figure 1 Sparton Flextensional Transducers. From Ref. 1.

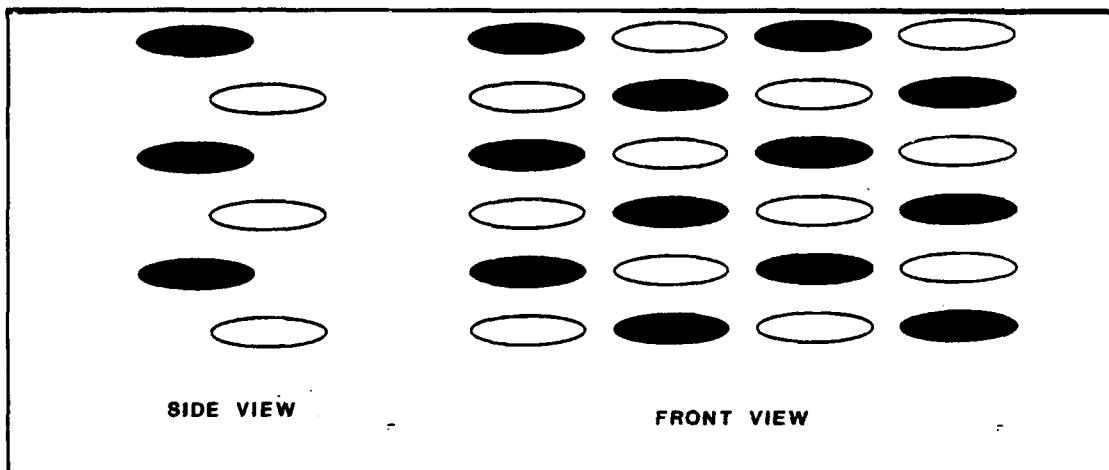


Figure 2 "Billboard" Array Concept.

for the radiation problem as soon this capability is available in ATILA.

A two-dimensional (axisymmetric) model of the ring-shell transducer was developed by the Naval Undersea Warfare Center [Ref. 4]. This model contains 285 elements, 825 nodes, and 1026 degrees-of-freedom. However, an axisymmetric model is not sufficient for modeling a dense array, since all modes of vibration (symmetric and anti-symmetric) can be excited by the incoming pressure field generated by neighboring transducers. A three-dimensional model is necessary.

A three-dimensional model is considerably more complex and requires far more computational time and computer memory. There is, however, a limit of 3000 degrees-of-freedom imposed by our version of the ATILA code. This limitation means that it is not feasible to obtain a three-dimensional model of the ring-shell transducer by a simple rotation of the axisymmetric model about its axis of symmetry. Instead, a simplified three-dimensional model with an acceptable engineering accuracy was pursued.

The remainder of this thesis is divided into six chapters. Chapter II describes the theory involved with the finite element analysis of piezoelectric transducers. Chapter III describes the transducer in question. Chapter IV discusses finite element model design considerations and the characteristics of the three-dimensional model. Chapter V presents and discusses the results of in-air modal analyses

and in-water harmonic analyses. Chapter VI presents the conclusions. Appendix A contains a copy of the input data file for the most refined mesh used in the harmonic analyses.

II. THEORY

A. FINITE ELEMENT ANALYSIS, THE ATILA CODE

The application of finite element analysis (FEA) to solve boundary value problems consists of the transformation of the governing differential or integral equation(s) into a multi-nodal matrix equation, the solution of which represents the discretized solution of the problem. There are many techniques to obtain a finite element formulation [Refs. 6,7,8,9].

ATILA is a finite element code developed at Institut Supérieur d'Electronique du Nord (ISEN) in France for the analysis of underwater transducers. It utilizes the variational formulation of the finite element problem [Refs. 10,11,12,13,14].

ATILA uses quadratic isoparametric elements. Isoparametric means the same polynomial (quadratic) is used to interpolate both geometry and field variation.

ATILA has 46 different types of elements. There are shell, plate, transition, spring, trilaminar, and two- and three-dimensional isoparametric elements of various geometries. It is possible to model elastic, piezoelectric, magnetostrictive, magnetic and composite materials, fluids, solid-fluid interfaces, and radiation dampers.

ATILA can perform: (1) static analyses, (2) modal analyses, which correspond to a free vibration problem, where the eigenfrequencies and eigenmodes are computed, and (3) harmonic analyses of radiation or scattering problems, which correspond to a forced vibration problem, the excitation being the voltage applied across the electrical terminals of the transducer or external forces applied to the nodes.

B. HARMONIC ANALYSIS OF A RADIATING PIEZOELECTRIC TRANSDUCER

This problem is governed by the equations of motion in the elastic and piezoelectric structures, by Poisson's Equation in the piezoelectric structures, and by Helmholtz's Equation in the fluid. Appropriate boundary conditions are defined, both on the solid-fluid interface and over the external fluid boundary, which must simulate the appropriate radiation condition.

The solid equation of motion is given by [Refs. 13,18,19]:

$$\rho \frac{\partial^2 u_i}{\partial t^2} = \frac{\partial \sigma_{ij}}{\partial x_j} \quad (1)$$

where ρ is the solid material density, u is the displacement vector, t is time, $[\sigma]$ is the stress tensor, and x_j is a coordinate direction. Here i and j can be 1, 2 and 3, and the Einstein notation is used, where summation is implied over repeated indices in the same term.

Poisson's Equation is given by [Refs. 13,18,19]:

$$\frac{\partial D_i}{\partial x_i} = 0 \quad (2)$$

where D is the electric displacement vector and x_i is a coordinate direction; i can be 1, 2 and 3.

The linearized, lossless Helmholtz Equation for the propagation of sound in fluids is given by [Ref. 15]:

$$\nabla^2 p - \frac{1}{c^2} \frac{\partial^2 p}{\partial t^2} = 0 \quad (3)$$

where ∇^2 is the three-dimensional Laplacian operator, p is the acoustic pressure, and t is time.

In piezoelectric materials the stress tensor and the electric displacement vector can be related to the strain tensor and the electric field vector and its material properties using the following constitutive equations, which neglect magnetic and pyroelectric effects [Refs. 13,18,19]:

$$\sigma_{ij} = c_{ijkl}^E S_{kl} - e_{kij} E_k \quad (4)$$

$$D_i = e_{ikl} S_{kl} + \epsilon_{ij}^S E_j \quad (5)$$

where $[\sigma]$ is the stress tensor, $[S]$ is the strain tensor, E is the electric field vector, D is the electric displacement

vector, $[c^E]$ is the constant electric field elastic stiffness tensor, $[e]$ is the piezoelectric tensor, and $[\epsilon^S]$ is the constant strain dielectric tensor; i, j, k and l can be equal to 1, 2 and 3.

Ultimately the solution is desired in terms of displacements and electric potentials. To this end the following two equations from elasticity and electricity, respectively, are used [Refs. 13,18,19]:

$$S_{ij} = \frac{1}{2} \left(\frac{\partial u_i}{\partial x_j} + \frac{\partial u_j}{\partial x_i} \right) \quad (6)$$

$$E_i = - \frac{\partial \Phi}{\partial x_i} \quad (7)$$

where $[S]$ is the strain tensor, u is the displacement vector, x_i is a coordinate direction, E is the electric field vector and Φ is the electrical potential; i and j can be equal to 1, 2 and 3.

The boundary conditions and prescribed excitations at each node can be defined either by a displacement or an applied force, an electrical potential or an electrical charge, or an acoustic pressure.

In ATILA, the previous seven equations are transformed into the following matrix equation [Refs. 2,11,12,14]:

$$\begin{bmatrix} [K_{uu}] - \omega^2 [M] & [K_{u\phi}] & -[L] \\ [K_{u\phi}]^T & [K_{\phi\phi}] & [0] \\ -\rho^2 c^2 \omega^2 [L]^T & [0]^T & [H] - \omega^2 [M_1] \end{bmatrix} \begin{bmatrix} U \\ \Phi \\ P \end{bmatrix} = \begin{bmatrix} F \\ -q \\ \rho c^2 \Psi \end{bmatrix} \quad (8)$$

where the variables are defined as:

- U : vector of the nodal values of the components of the displacement field,
- Φ : vector of the nodal values of the electrical potential,
- P : vector of the nodal values of the pressure field,
- F : vector of the nodal values of the components of the externally applied forces,
- q : vector of the nodal values of the externally applied electrical charges,
- Ψ : vector of the nodal values of the integrated normal derivative of the externally applied pressure field (proportional to the externally applied flux),
- $[K_{uu}]$: stiffness matrix,
- $[K_{u\phi}]$: piezoelectric matrix,
- $[K_{\phi\phi}]$: dielectric matrix,
- $[M]$: consistent mass matrix,
- $[H]$: fluid (pseudo-) stiffness matrix,

$[M_f]$: consistent fluid (pseudo-) mass matrix,
 $[L]$: coupling matrix at the fluid structure interface,
 $[0]$: zero matrix,
 ω : angular frequency,
 ρ : fluid density,
 c : fluid sound speed,

and the superscript T represents the matrix transpose.

The results of this analysis for each input frequency are the complex displacement, rotation, and electrical potential fields at each transducer node, the complex pressure field at each fluid node, and the complex electrical impedance and admittance.

C. MODAL ANALYSIS OF A PIEZOELECTRIC TRANSDUCER

This problem is governed by the equations of motion in the elastic and piezoelectric structures, and by Poisson's Equation in the piezoelectric structures. The matrix equation governing this problem is easily obtained from that described in the previous section. In a modal analysis there is no fluid and there are no external forces applied (the natural boundary conditions), so the third row and column of Eq. (8) become irrelevant, and F is replaced by 0, resulting in

$$\begin{bmatrix} [K_{uu}] - \omega^2 [M] & [K_{u\phi}] \\ [K_{u\phi}]^T & [K_{\phi\phi}] \end{bmatrix} \begin{bmatrix} U \\ \Phi \end{bmatrix} = \begin{bmatrix} 0 \\ -Q \end{bmatrix} \quad (9)$$

where the elements are as defined in Eq. (8).

In this equation the resonance condition, which corresponds to the electrical short-circuit condition, is obtained by setting $\Phi=0$. The anti-resonance condition, which corresponds to the electrical open-circuit condition, is obtained by setting $q=0$.

The results of this analysis are the eigenfrequencies and eigenmodes. The maximum number of modes, which must be specified by the user, is 100.

III. TRANSDUCER DESCRIPTION

The transducer modeled in this research project is the Model 34A0610 manufactured by Sparson of Canada, Ltd. [Ref. 1]. It is a depth-compensated, high power, low frequency type V flextensional transducer (so-called "ring-shell"). A cutaway view is shown in Fig. 3 [Ref. 1]. The motor element consists of a set of 144 plates of thickness-poled lead zirconate titanate ceramic of dimensions 8x8x1 cm separated by 72 steel wedges, arranged in a 0.8 m diameter ring [Ref. 4]. The ceramic plates are connected electrically in parallel and effectively poled tangentially. One ST 4340 steel thin shell (a spherical section) is fastened to each ring planar surface. The ring is wrapped on the outside by a fiberglass belt, which provides a compressive stress of 25-40 MPa [Ref. 4].

The main operational characteristics of the transducer are [Ref. 1]:

- a. Resonance Frequency, which corresponds to the maximum voltage response in water - 610 Hz;
- b. Source Pressure Level, which corresponds to the effective pressure on the acoustic axis, at resonance - 213 dB re 1 μ Pa at 1 meter (driven by 3000 volts rms);

- c. Efficiency, which is the ratio of the output acoustic power to the input electric power - 90 percent at resonance, 65 percent at the -6dB points;
- d. Operational Depth, which corresponds to the maximum depth where the performance of the transducer is not compromised - exceeds 400 m.

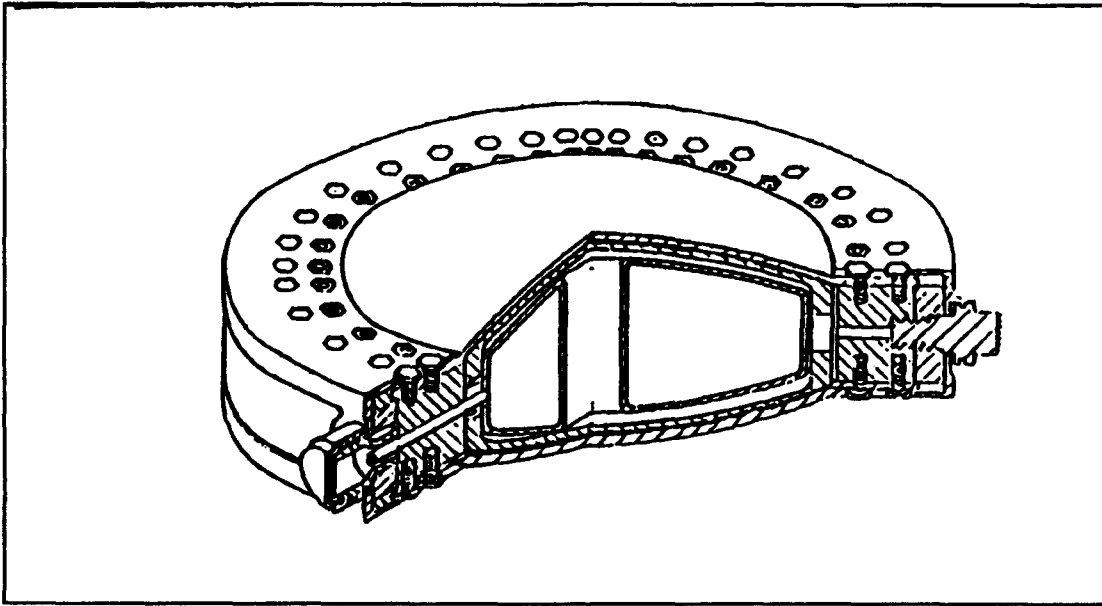


Figure 3 Cutaway view of the transducer. From Ref. 1.

IV. THREE-DIMENSIONAL MODEL

A. INTRODUCTION

As mentioned in Chapter I, the performance modeling of a dense sonar array by means of the T- matrix method requires the computation of the radiation and scattering of an individual transducer. This can be accomplished very accurately using finite element analysis (FEA); however a three-dimensional (3-D) model must be employed.

A 3-D finite element model of a flextensional transducer has an inherent complexity compared to a corresponding 2-D model. The major limitation is the number of degrees of freedom (DOF) available, which depends upon the computer used. A simple transformation of the available 2-D model into a 3-D model would represent roughly more than 10000 DOF just for the solid structure. This already exceeds the maximum allowed degrees of freedom on the MICROVAX VMS system, where the ATILA code is installed, and so is not feasible.

Consequently, the objective of this research became to develop the simplest 3-D model of the Sparton ring-shell transducer that could reproduce, within acceptable error limits when compared with experimental data, its pertinent electroacoustic properties.

B. CHARACTERISTICS OF THE MODEL

1. MATERIAL PROPERTIES

All material properties are included on the first page of Appendix A. The format is according to the ATILA user's manual [Ref. 2].

a. Piezoelectric ceramic

As described before, the transducer has 144 tangentially poled lead zirconate titanate ceramic plates separated by 72 steel wedges, arranged in a 0.8 m diameter ring. An illustration of this arrangement is shown in Fig. 4. In order to simplify the model, a homogeneous ring with material properties equivalent to an adequate combination of the ceramic and steel was used. This is illustrated in Fig. 5. These properties were provided to us by Blottman who obtained them from McMahon [Ref. 4]: "The smeared material properties were obtained by McMahon and Armstrong through in-air measurement of the segmented ring during various stages of assembly. The measurements consist of the resonance and anti-resonance frequencies and the electrical capacitance." These properties take into consideration the compression given by the fiberglass wrapping. The given ceramic properties include losses, but as will be noted later, the results of harmonic analyses that included losses yielded a pressure field about 100 times smaller than the corresponding experimental results.

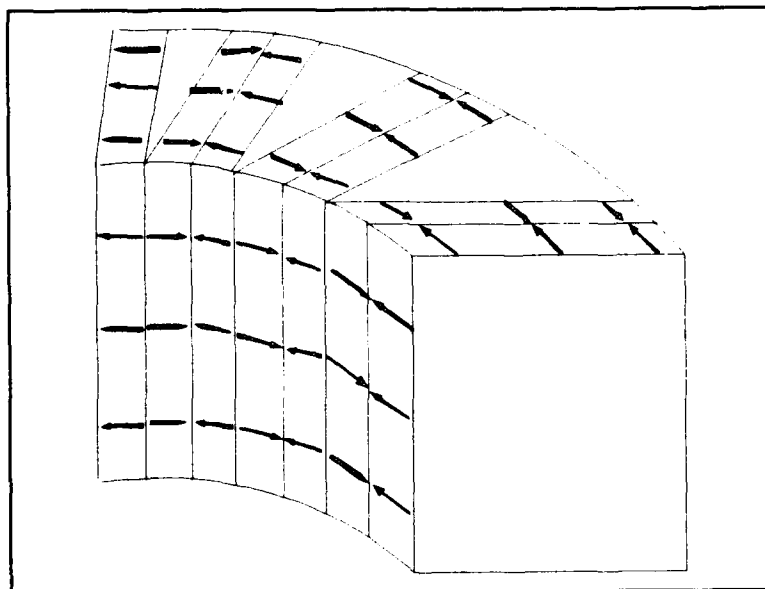


Figure 4 Original ring-shell arrangement.

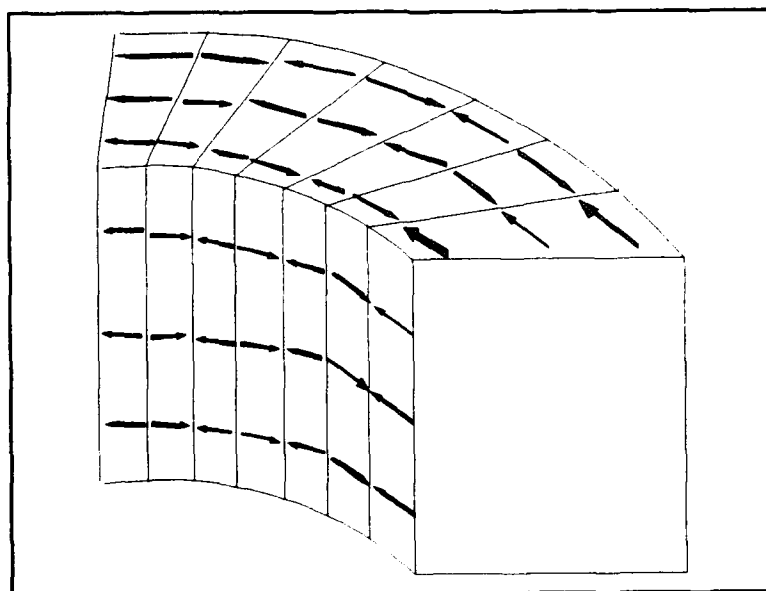


Figure 5 Smeared ring-shell arrangement.

To model the transducer with its actual polarization requires the use of a very large number of elements because of the mesh design requirements; therefore the polarization was switched to an equivalent axially-poled ring. The transformation of the polarization is obtained by a suitable exchange of the elastic, piezoelectric and dielectric tensors. The procedure is outlined in the ATILA user's manual [Ref. 2].

Note that the ATILA manual describes the transformation from tangential polarization to radial polarization, which is not the present case. An axial orientation was chosen here rather than a radial orientation in order to simplify the application of electrical boundary conditions. Because of this modification the results of harmonic analyses have to be modified as follows: (1) divide the displacement and pressure fields by the ratio of the circumferential length of a "smeared" piezoelectric element (which is equal to $1/144$ of the the ring circumferencial length) to its height, and (2) multiply the electrical impedance by the square of the same ratio. In the present case this ratio is 0.1958.

b. Fiberglass

To simplify the model the fiberglass wrapping was modeled as an equivalent shell; otherwise a considerable number of additional elements would be required.

c. Shells

Their actual material properties were used.

2. TYPES OF ELEMENTS

The following quadratic isoparametric elements, which are described in the ATILA User's Manual [Ref. 2], were used:

TABLE 1

Region	Element	Geometry
Piezoelectric ring	HEXA20P	20-node hexahedron
Shells	SHEL06C	6-node triangle
Fiberglass wrapping	QUAD08E	8-node quadrilateral
Interface solid-fluid	TRIA12I	2x6-node triangle
Interface solid-fluid	QUAD16I	2x8-node quadrilateral
Fluid	PRISM15F	15-node triangular base prism
Fluid	HEXA20F	20-node hexahedron
Radiation surface	TRIA06R	6-node triangle
Radiation surface	QUAD08R	8-node quadrilateral

3. CONSTRAINTS ON MESH DESIGN

Design of the mesh was guided by the following constraints:

a. Aspect ratio [Ref. 2]

The aspect ratio of each element should be not greater than 3, although 4 is considered an acceptable, though less conservative, value.

b. Internal angles [Ref. 2]

The internal angles of each elements should be not smaller than 45 degrees and not greater than 135 degrees, although 30 degrees and 150 degrees are considered, respectively, acceptable, though less conservative, values.

c. Element size [Ref. 2]

As ATILA utilizes quadratic interpolation functions, the size of each element must be not greater than one fourth of a wavelength at the highest frequency of interest.

d. Interelement compatibility

The mesh should be built in such a way that adjacent elements have adjoining sides with collocated nodes to ensure accurate interpolation at their interfaces.

e. Coupling of shell elements to solid elements

Unlike two-dimensional elements, ATILA does not provide three-dimensional transition elements to match solid (piezoelectric) and shell three-dimensional elements. To

perform harmonic analyses it was necessary to delete the rotational degrees-of-freedom (DOF) for the piezoelectric nodes, which means that a clamped condition, which is not quite realistic, was assumed between the shell and the piezoelectric ring. As will be seen later, as the mesh becomes more and more refined, this assumed boundary condition becomes less and less significant.

f. Radiation boundary elements [Ref. 2]

For in-water harmonic analyses (radiation problems) the fluid mesh outer limit must be spherical. This is required by the radiation elements available in the ATILA code. ATILA offers so-called monopole and dipole radiation damping elements. The latter includes not only the monopole term of the radiated field multipolar expansion, but also the dipole term. Dipolar damping elements were selected to terminate the fluid mesh because they provide a more accurate solution than the monopolar damping elements for the mesh employed.

A fluid mesh outer limit radius greater than the far-field distance is desirable to compute the acoustic source pressure level and to compare computed and measured acoustic pressure data. The boundary was placed at a radius R equal to 0.72 m from the transducer's acoustical center, which is beyond 3.5 times the far-field limit of the equivalent piston-like source at the resonance frequency [Ref. 16].

4. FINAL MESH DESIGNS

With the above constraints one coarse mesh was designed for each type of analysis to be performed: in-air modal and in-water harmonic. An in-air modal analysis requires only the transducer to be modeled. An in-water harmonic analysis requires in addition the surrounding fluid to be modeled. The transducer coarse mesh consists of 12 shell elements and 8 solid elements, totaling 250 DOF, and is shown in Fig. 6. The total coarse mesh, which includes the fluid, contains in addition, 20 interface elements, 72 fluid elements, and 28 radiating elements, totaling 1330 DOF. This mesh is shown in Fig. 7. Based on these meshes and using the pre-processor mesh generator MOSAIQUE [Ref. 2], two mesh refinements were obtained. The most refined transducer mesh, which is shown in Fig. 8, consists of 40 shell elements and 24 solid elements, totaling 557 DOF. The corresponding total mesh, which is shown in Fig. 9, contains, in addition, 56 interface elements, 176 fluid elements and 72 radiating elements, totaling 2868 DOF. The input data file of this mesh is given in Appendix A.

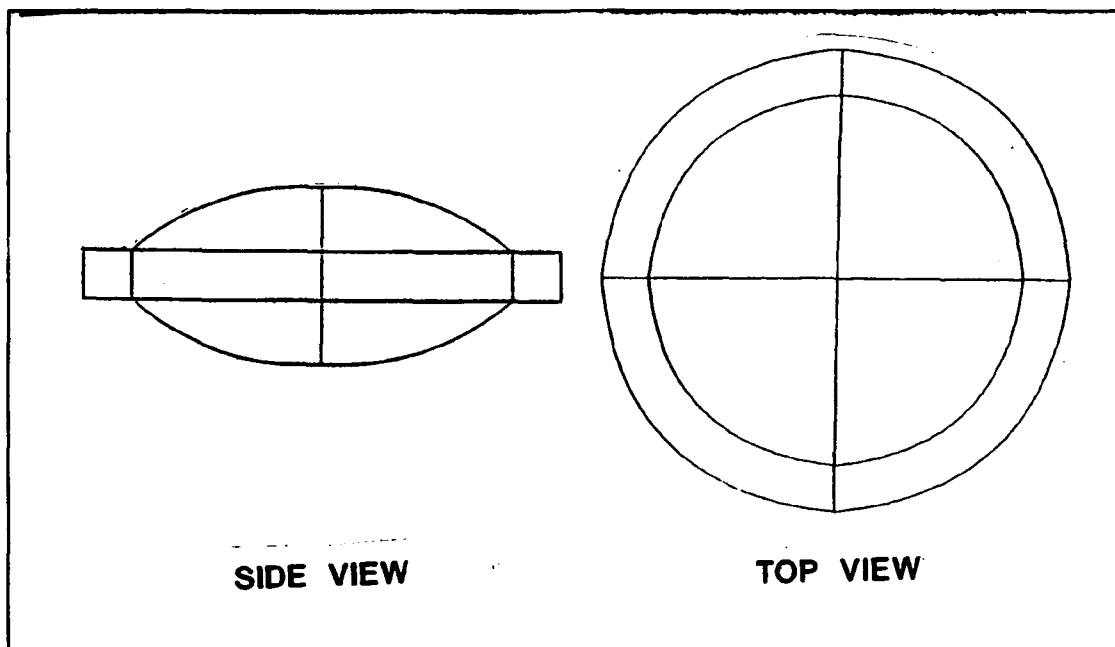


Figure 6 Transducer coarse mesh.

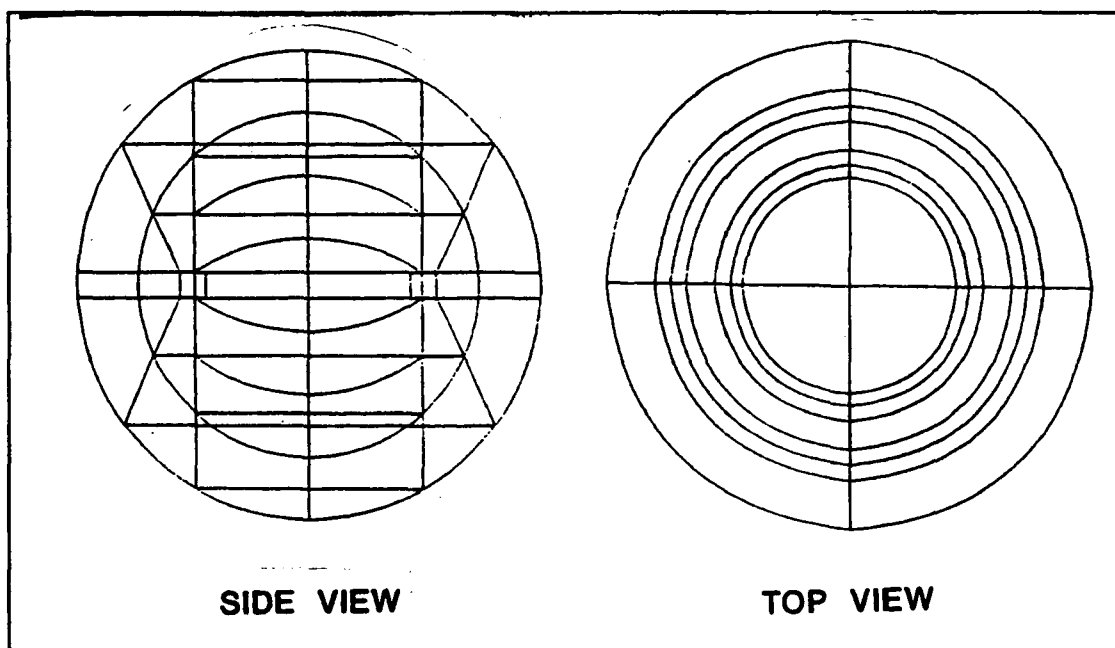


Figure 7 Total coarse mesh.

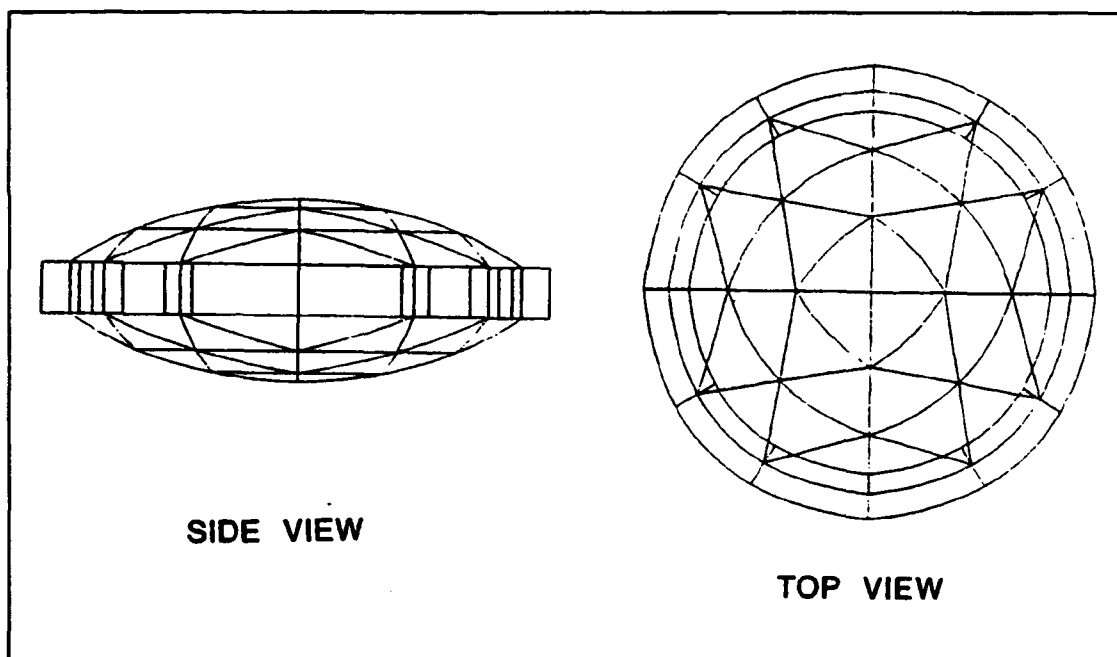


Figure 8 Transducer refined mesh.

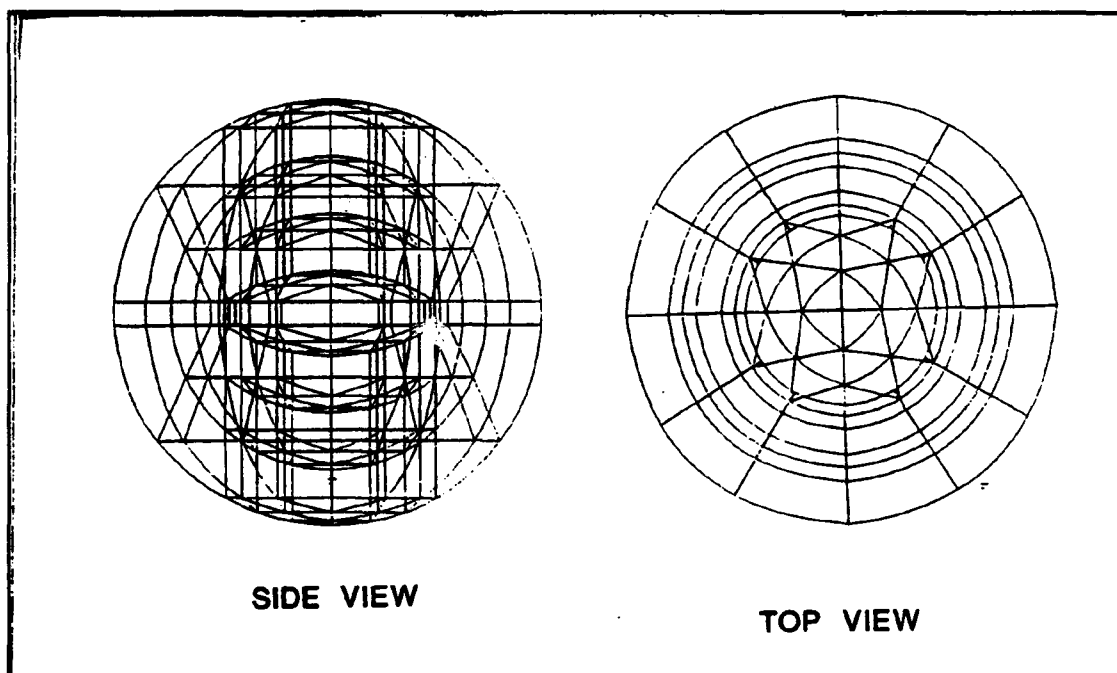


Figure 9 Total refined mesh.

V. RESULTS

A. IN-AIR MODAL ANALYSES

This analysis corresponds to a free vibration problem, where the eigenfrequencies and eigenmodes are computed. Three mesh grades were analysed. For each one, the first twenty eigenfrequencies and eigenmodes were calculated (including the rigid body ones). The following table, which includes the two-dimensional (2-D) model, summarizes some characteristics of each mesh, along with the resonance frequency of the mode of vibration shown in Fig. 10, which is the most important in operation.

TABLE 2

Mesh	Coarse	Inter- mediate	Refined	2-D Model
Nodes	86	202	350	191
Elements	20	56	180	42
DOF	250	730	1330	392
Micro Vax II CPU Time	580 sec	9 hr	24 hr	14 min
Frequency	1746 Hz	1098 Hz	1002 Hz	957 Hz

The dashed lines in Fig. 10 correspond to the rest position; the solid lines correspond to the displaced position. Note the opposite sense of the motion of the ring and shells.

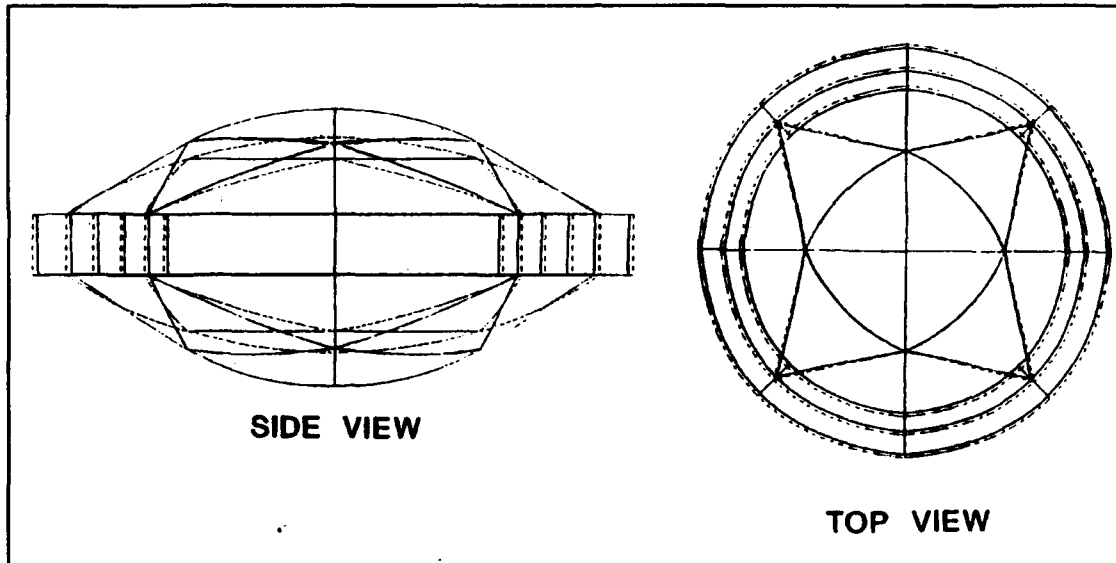


Figure 10 Ring mode of vibration.

A comparison between the results of the ring mode frequency for the more refined 3-D mesh and the 2-D model shows that the first is 5 percent higher than the second. Notice from Table 2 that as the mesh becomes more and more refined, the ring mode natural frequency value approaches more closely the corresponding 2-D model value. This is in part due to the clamped condition between the shell and the piezoelectric ring, which is not quite right, and possibly because of the use of a limited number of elements to describe the shape of the shell.

B. IN-WATER HARMONIC ANALYSES

This analysis corresponds to a forced vibration problem, the excitation being the voltage applied across the electrical terminals of the transducer. Three mesh grades were analysed, now including not only the transducer elements, but the interface, fluid and radiating elements. Internal material losses are not included in this model because the results obtained with such losses included were found to be about 40 dB below the corresponding measured values. The reason for this is not known. It is a problem which appeared only in three-dimensional modeling; no such problem was observed for axisymmetric models. In any case, neglecting internal losses is not a serious deficiency, since radiation losses dominate.

The following table, which includes the two-dimensional model and the manufacturer's measured values, summarizes some characteristics of each mesh along with the maximum sound pressure level (SPL) in dB re $1\mu\text{Pa}$ at a distance of 1m on the acoustic axis when driven by 3000 Vrms at the corresponding frequency.

TABLE 3

Mesh	Coarse	Refined	More Refined	2-D Model	Measured
Nodes	392	972	1696	825	xxxx
Elements	140	360	706	285	xxxx
DOF	557	1501	2868	1026	xxxx
Micro Vax II CPU time	3 hrs	33 hrs	101 hrs	48 min	xxxx
SPL dB re 1 μ Pa	200	209	217	213	213
Frequency Hz	1108	662	610	628	610

The following plot depicts the transmitting voltage response curve obtained by ATILA along with the corresponding manufacturer's data. The model displays a higher peak sound pressure level (SPL) for the primary resonance than the actual transducer. This was expected, since internal material losses were not considered.

It can be observed also from FIG. 11 that the second resonance of the model occurs at a considerably higher frequency than for the actual device. As discussed before, the probable explanation for this is that even the most refined

mesh used is not refined enough to represent the transducer dynamical behavior completely. This is in part due to the clamped condition between the shell and the piezoelectric ring, which is not quite right.

Notice in Table 3 that as the mesh becomes more and more refined, the SPL and resonant frequency values approach more closely the corresponding measured values. An attempt was made to perform a harmonic analysis using a mesh which was more refined (4184 DOF). This was not successful, however; apparently the number of degrees-of-freedom exceeded the limit imposed by our copy of ATILA.

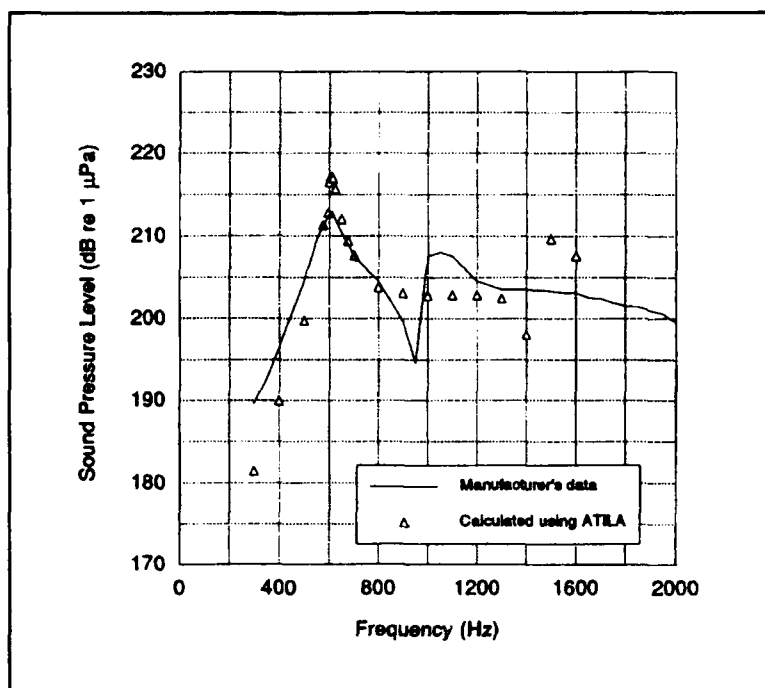


Figure 11 Transmitting voltage response curve at 1m on acoustic axis driven at 3000 Vrms.

Plots of electrical impedance versus frequency and impedance circle for the more refined model are depicted in Figs. 12 and 13, respectively. Finally, electrical admittance versus frequency and the admittance circle are shown in Figs. 14 and 15, respectively.

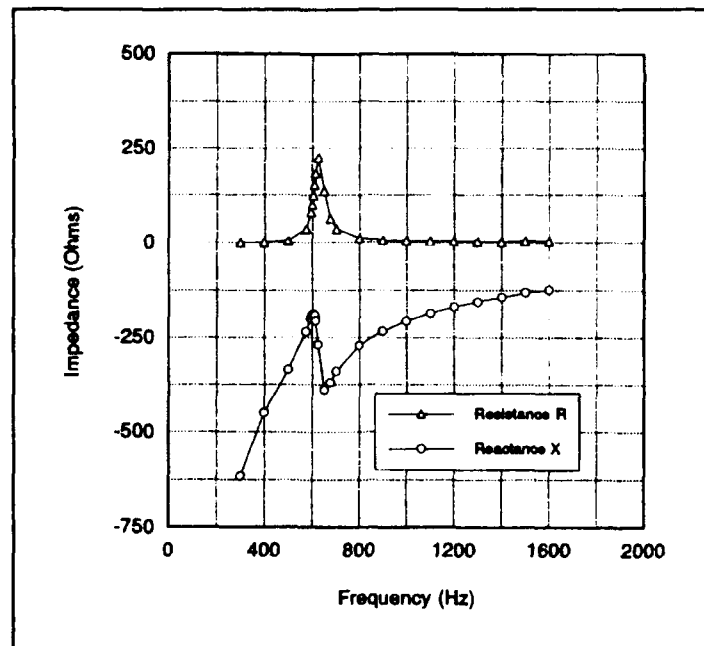


Figure 12 Impedance versus frequency.

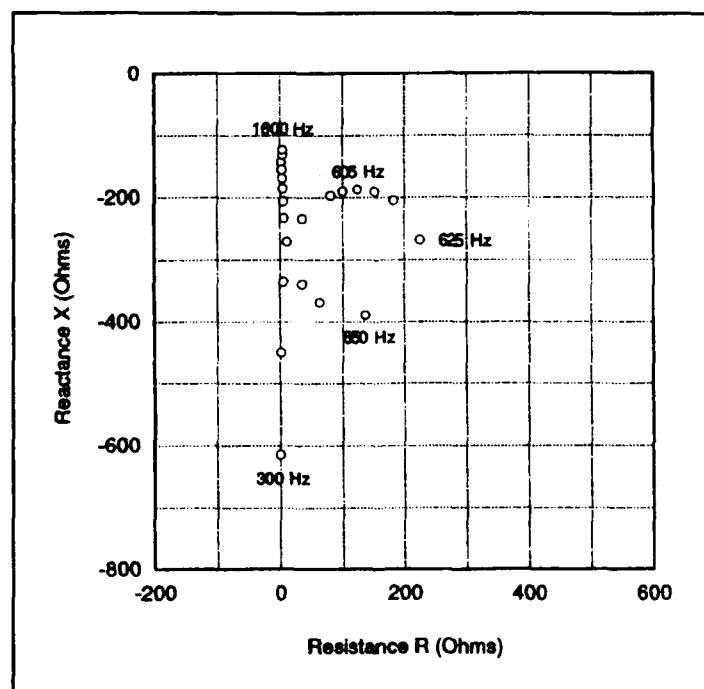


Figure 13 Impedance circle.

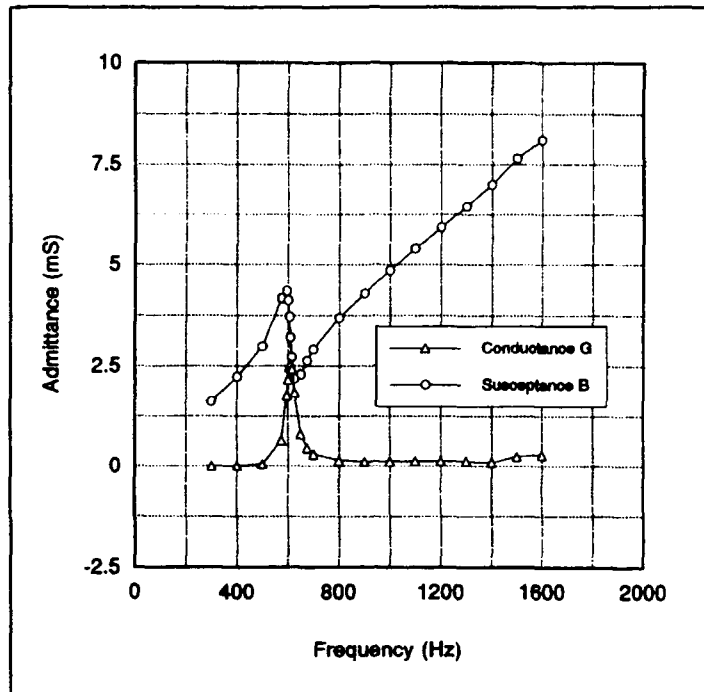


Figure 14 Admittance versus frequency.

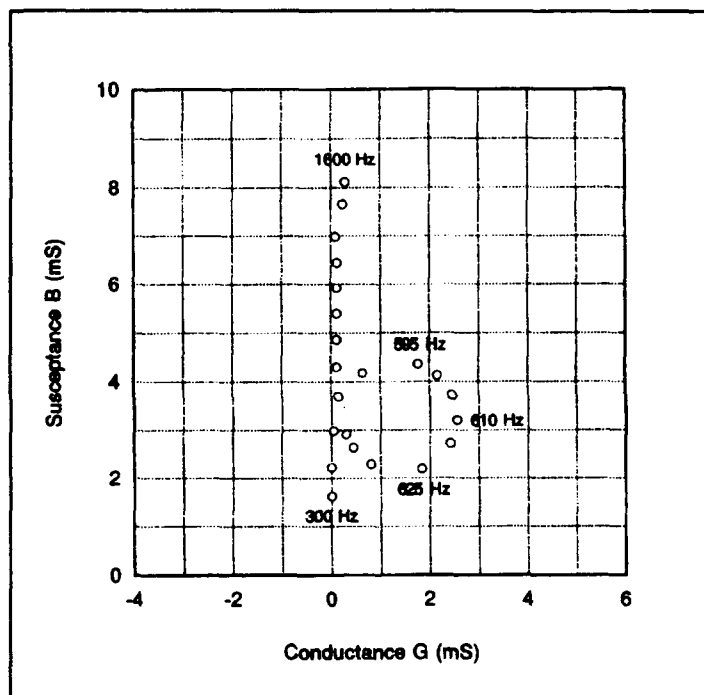


Figure 15 Admittance circle.

VI. CONCLUSIONS

A three-dimensional model of a ring-shell flextensional transducer was built. Although the model includes many necessary simplifications to handle the problem in the available MICROVAX VMS system, the model is successful in obtaining a maximum sound pressure level from the in-water harmonic analyses that differs by 4 dB from the measured value and is located exactly at the same frequency.

The model does not consider internal material losses because the ATILA code was not able to compute accurate results for the three-dimensional model in this case. These difficulties were not encountered with axisymmetric models.

The model was built for the purpose of computing the radiation and scattering properties of the Sparton ring-shell transducer, the results of which are to be combined with an acoustic field model in order to describe the performance of a dense sonar array. Thus far the model has been used to compute the radiation pressure field. It will be used to compute the scattered pressure field when this capability becomes available in ATILA.

APPENDIX A

INPUT DATA FILE

```

* TRANSDUCER:RINGSHELL / TWO STEP REFINED THREE-DIMENSIONAL MESH.
*
*=====*
* MANUFACTURER:SPARTON OF CANADA.      *
* MODEL:34A0610.                       *
* IN-WATER HARMONIC ANALYSIS.          *
* WRITTEN BY LCDR ROGERIO PINTO ON NOV,30,1992.  *
*=====*
*
SKYLINE REAL
PRECISION DOUBLE
RADIATION DIPOLAR
LCPDDC
10 ELECPOT PRESSURE THETAX THETAY UX UY UZ
NLOAD
40
FREQUENCY
1.100E+03 1.200E+03 1.300E+03 1.400E+03 1.500E+03 1.600E+03
ANALYSIS HARMONIC
MATERIAL
MAVART80
0.00000E+00 0.00000E+00 0.75500E+04 0.00000E+00 0.00000E+00 0.00000E+00&
0.82020E-11-0.35380E-11-0.27030E-11 0.00000E+00 0.00000E+00 0.00000E+00&
-0.35380E-11 0.11990E-10-0.35380E-11 0.00000E+00 0.00000E+00 0.00000E+00&
-0.27030E-11-0.35380E-11 0.82020E-11 0.00000E+00 0.00000E+00 0.00000E+00&
0.00000E+00 0.00000E+00 0.00000E+00 0.26000E-10 0.00000E+00 0.00000E+00&
0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.21800E-10 0.00000E+00&
0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.26000E-10&
0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00-0.28110E-09&
0.00000E+00 0.00000E+00 0.00000E+00-0.28110E-09 0.00000E+00 0.00000E+00&
-0.10000E-09 0.21390E-09-0.10000E-09 0.00000E+00 0.00000E+00 0.00000E+00&
0.11480E-07 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00&
0.00000E+00 0.11480E-07 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00&
0.00000E+00 0.00000E+00 0.11480E-07 0.00000E+00 0.00000E+00 0.00000E+00&
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0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00-0.10400E-11&
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0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00&
0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00&
-0.45920E-12 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00&
0.00000E+00-0.45920E-12 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00&
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ST4340
0.100E+01 0.195E+12 0.280E+00 0.770E+04 0.000E+00 0.100E+01 &
0.195E+12 0.280E+00 0.770E+04
FICFIBER
0.645E+09 0.400E+00 0.806E+04
GEOMETRY
1
0.105E-01 *THICKNESS OF SHELLS.
2
0.500E-02 *THICKNESS OF FICTICIOUS FIBER WRAPPING.
3
0.720E+00 *RADIUS OF FLUID MESH OUTER LIMIT.

```

GEOMETRY POLARIZA CARTESIA

4
0.000E+00 0.000E+00 0.180E+03
5
0.000E+00 0.000E+00 0.210E+03
6
0.000E+00 0.000E+00 0.240E+03
7
0.000E+00 0.000E+00 0.270E+03
8
0.000E+00 0.000E+00 0.300E+03
9
0.000E+00 0.000E+00 0.330E+03
10
0.000E+00 0.000E+00 0.000E+00
11
0.000E+00 0.000E+00 0.030E+03
12
0.000E+00 0.000E+00 0.060E+03
13
0.000E+00 0.000E+00 0.090E+03
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*	98	*	0.40000E-01	0.19497E+00	-0.32056E+00
*	99	*	0.40000E-01	0.32056E+00	-0.19497E+00
*	100	*	0.40000E-01	0.37679E+00	0.00000E+00
*	101	*	0.40000E-01	0.99897E-01	-0.33628E+00
*	102	*	0.40000E-01	0.18347E+00	-0.30167E+00
*	103	*	0.40000E-01	0.25073E+00	-0.25073E+00
*	104	*	0.40000E-01	0.30167E+00	-0.18347E+00
*	105	*	0.40000E-01	0.33628E+00	-0.99897E-01
*	106	*	0.40000E-01	0.35458E+00	0.00000E+00
*	107	*	-0.40000E-01	0.17427E+00	-0.28653E+00
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*	109	*	-0.40000E-01	0.33679E+00	0.00000E+00
*	110	*	-0.40000E-01	0.89872E-01	-0.30254E+00
*	111	*	-0.40000E-01	0.16506E+00	-0.27140E+00

* 112 *	-0.40000E-01	0.22557E+00	-0.22557E+00
* 113 *	-0.40000E-01	0.27140E+00	-0.16506E+00
* 114 *	-0.40000E-01	0.30254E+00	-0.89872E-01
* 115 *	-0.40000E-01	0.31900E+00	0.00000E+00
* 116 *	0.00000E+00	0.16506E+00	-0.27140E+00
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* 118 *	0.00000E+00	0.31900E+00	0.00000E+00
* 119 *	0.40000E-01	0.17427E+00	-0.28653E+00
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* 133 *	-0.40000E-01	0.00000E+00	0.39900E+00
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* 135 *	-0.40000E-01	0.19497E+00	0.32056E+00
* 136 *	-0.40000E-01	0.00000E+00	0.37679E+00
* 137 *	-0.40000E-01	0.33628E+00	0.99897E-01
* 138 *	-0.40000E-01	0.30167E+00	0.18347E+00
* 139 *	-0.40000E-01	0.25073E+00	0.25073E+00
* 140 *	-0.40000E-01	0.18347E+00	0.30167E+00
* 141 *	-0.40000E-01	0.99897E-01	0.33628E+00
* 142 *	-0.40000E-01	0.00000E+00	0.35458E+00
* 143 *	0.00000E+00	0.33946E+00	0.20646E+00
* 144 *	0.00000E+00	0.20646E+00	0.33946E+00
* 145 *	0.00000E+00	0.00000E+00	0.39900E+00
* 146 *	0.00000E+00	0.30167E+00	0.18347E+00
* 147 *	0.00000E+00	0.18347E+00	0.30167E+00
* 148 *	0.00000E+00	0.00000E+00	0.35458E+00
* 149 *	0.40000E-01	0.37841E+00	0.11241E+00
* 150 *	0.40000E-01	0.33946E+00	0.20646E+00
* 151 *	0.40000E-01	0.28214E+00	0.28214E+00
* 152 *	0.40000E-01	0.20646E+00	0.33946E+00
* 153 *	0.40000E-01	0.11241E+00	0.37841E+00
* 154 *	0.40000E-01	0.00000E+00	0.39900E+00
* 155 *	0.40000E-01	0.32056E+00	0.19497E+00
* 156 *	0.40000E-01	0.19497E+00	0.32056E+00
* 157 *	0.40000E-01	0.00000E+00	0.37679E+00
* 158 *	0.40000E-01	0.33628E+00	0.99897E-01
* 159 *	0.40000E-01	0.30167E+00	0.18347E+00
* 160 *	0.40000E-01	0.25073E+00	0.25073E+00
* 161 *	0.40000E-01	0.18347E+00	0.30167E+00
* 162 *	0.40000E-01	0.99897E-01	0.33628E+00
* 163 *	0.40000E-01	0.00000E+00	0.35458E+00
* 164 *	-0.40000E-01	0.28653E+00	0.17427E+00
* 165 *	-0.40000E-01	0.17427E+00	0.28653E+00
* 166 *	-0.40000E-01	0.00000E+00	0.33679E+00
* 167 *	-0.40000E-01	0.30254E+00	0.89872E-01
* 168 *	-0.40000E-01	0.27140E+00	0.16506E+00
* 169 *	-0.40000E-01	0.22557E+00	0.22557E+00
* 170 *	-0.40000E-01	0.16506E+00	0.27140E+00
* 171 *	-0.40000E-01	0.89872E-01	0.30254E+00
* 172 *	-0.40000E-01	0.00000E+00	0.31900E+00
* 173 *	0.00000E+00	0.27140E+00	0.16506E+00
* 174 *	0.00000E+00	0.16506E+00	0.27140E+00
* 175 *	0.00000E+00	0.00000E+00	0.31900E+00
* 176 *	0.40000E-01	0.28653E+00	0.17427E+00
* 177 *	0.40000E-01	0.17427E+00	0.28653E+00
* 178 *	0.40000E-01	0.00000E+00	0.33679E+00
* 179 *	0.40000E-01	0.30254E+00	0.89872E-01
* 180 *	0.40000E-01	0.27140E+00	0.16506E+00

* 181 *	0.40000E-01	0.22557E+00	0.22557E+00
* 182 *	0.40000E-01	0.16506E+00	0.27140E+00
* 183 *	0.40000E-01	0.89872E-01	0.30254E+00
* 184 *	0.40000E-01	0.00000E+00	0.31900E+00
* 185 *	-0.40000E-01	-0.11241E+00	0.37841E+00
* 186 *	-0.40000E-01	-0.20646E+00	0.33946E+00
* 187 *	-0.40000E-01	-0.28214E+00	0.28214E+00
* 188 *	-0.40000E-01	-0.33946E+00	0.20646E+00
* 189 *	-0.40000E-01	-0.37841E+00	0.11241E+00
* 190 *	-0.40000E-01	-0.19497E+00	0.32056E+00
* 191 *	-0.40000E-01	-0.32056E+00	0.19497E+00
* 192 *	-0.40000E-01	-0.99897E-01	0.33628E+00
* 193 *	-0.40000E-01	-0.18347E+00	0.30167E+00
* 194 *	-0.40000E-01	-0.25073E+00	0.25073E+00
* 195 *	-0.40000E-01	-0.30167E+00	0.18347E+00
* 196 *	-0.40000E-01	-0.33628E+00	0.99897E-01
* 197 *	0.00000E+00	-0.20646E+00	0.33946E+00
* 198 *	0.00000E+00	-0.33946E+00	0.20646E+00
* 199 *	0.00000E+00	-0.18347E+00	0.30167E+00
* 200 *	0.00000E+00	-0.30167E+00	0.18347E+00
* 201 *	0.40000E-01	-0.11241E+00	0.37841E+00
* 202 *	0.40000E-01	-0.20646E+00	0.33946E+00
* 203 *	0.40000E-01	-0.28214E+00	0.28214E+00
* 204 *	0.40000E-01	-0.33946E+00	0.20646E+00
* 205 *	0.40000E-01	-0.37841E+00	0.11241E+00
* 206 *	0.40000E-01	-0.19497E+00	0.32056E+00
* 207 *	0.40000E-01	-0.32056E+00	0.19497E+00
* 208 *	0.40000E-01	-0.99897E-01	0.33628E+00
* 209 *	0.40000E-01	-0.18347E+00	0.30167E+00
* 210 *	0.40000E-01	-0.25073E+00	0.25073E+00
* 211 *	0.40000E-01	-0.30167E+00	0.18347E+00
* 212 *	0.40000E-01	-0.33628E+00	0.99897E-01
* 213 *	-0.40000E-01	-0.17427E+00	0.28653E+00
* 214 *	-0.40000E-01	-0.28653E+00	0.17427E+00
* 215 *	-0.40000E-01	-0.89872E-01	0.30254E+00
* 216 *	-0.40000E-01	-0.16506E+00	0.27140E+00
* 217 *	-0.40000E-01	-0.22557E+00	0.22557E+00
* 218 *	-0.40000E-01	-0.27140E+00	0.16506E+00
* 219 *	-0.40000E-01	-0.30254E+00	0.89872E-01
* 220 *	0.00000E+00	-0.16506E+00	0.27140E+00
* 221 *	0.00000E+00	-0.27140E+00	0.16506E+00
* 222 *	0.40000E-01	-0.17427E+00	0.28653E+00
* 223 *	0.40000E-01	-0.28653E+00	0.17427E+00
* 224 *	0.40000E-01	-0.89872E-01	0.30254E+00
* 225 *	0.40000E-01	-0.16506E+00	0.27140E+00
* 226 *	0.40000E-01	-0.22557E+00	0.22557E+00
* 227 *	0.40000E-01	-0.27140E+00	0.16506E+00
* 228 *	0.40000E-01	-0.30254E+00	0.89872E-01
* 229 *	0.69986E-01	-0.30439E+00	0.00000E+00
* 230 *	0.69986E-01	-0.27616E+00	-0.93519E-01
* 231 *	0.69986E-01	-0.23160E+00	-0.17072E+00
* 232 *	0.69986E-01	-0.17072E+00	-0.23160E+00
* 233 *	0.69986E-01	-0.93519E-01	-0.27616E+00
* 234 *	0.69986E-01	0.00000E+00	-0.30439E+00
* 235 *	0.94876E-01	-0.25064E+00	0.00000E+00
* 236 *	0.94876E-01	-0.21246E+00	-0.87141E-01
* 237 *	0.94876E-01	-0.15796E+00	-0.15796E+00
* 238 *	0.94876E-01	-0.87141E-01	-0.21246E+00
* 239 *	0.94876E-01	0.00000E+00	-0.25064E+00
* 240 *	0.11467E+00	-0.19333E+00	0.00000E+00
* 241 *	0.11467E+00	-0.14521E+00	-0.80763E-01
* 242 *	0.11467E+00	-0.80763E-01	-0.14521E+00
* 243 *	0.11467E+00	0.00000E+00	-0.19333E+00
* 244 *	0.12937E+00	-0.13245E+00	0.00000E+00
* 245 *	0.12937E+00	-0.74386E-01	-0.74386E-01
* 246 *	0.12937E+00	0.00000E+00	-0.13245E+00
* 247 *	0.13897E+00	-0.68008E-01	0.00000E+00
* 248 *	0.13897E+00	0.00000E+00	-0.68008E-01
* 249 *	0.14348E+00	0.00000E+00	0.00000E+00

* 250 *	0.69986E-01	0.93519E-01	-0.27616E+00
* 251 *	0.69986E-01	0.17072E+00	-0.23160E+00
* 252 *	0.69986E-01	0.23160E+00	-0.17072E+00
* 253 *	0.69986E-01	0.27616E+00	-0.93519E-01
* 254 *	0.69986E-01	0.30439E+00	0.00000E+00
* 255 *	0.94876E-01	0.87141E-01	-0.21246E+00
* 256 *	0.94876E-01	0.15796E+00	-0.15796E+00
* 257 *	0.94876E-01	0.21246E+00	-0.87141E-01
* 258 *	0.94876E-01	0.25064E+00	0.00000E+00
* 259 *	0.11467E+00	0.80763E-01	-0.14521E+00
* 260 *	0.11467E+00	0.14521E+00	-0.80763E-01
* 261 *	0.11467E+00	0.19333E+00	0.00000E+00
* 262 *	0.12937E+00	0.74386E-01	-0.74386E-01
* 263 *	0.12937E+00	0.13245E+00	0.00000E+00
* 264 *	0.13897E+00	0.68008E-01	0.00000E+00
* 265 *	0.69986E-01	0.27616E+00	0.93519E-01
* 266 *	0.69986E-01	0.23160E+00	0.17072E+00
* 267 *	0.69986E-01	0.17072E+00	0.23160E+00
* 268 *	0.69986E-01	0.93519E-01	0.27616E+00
* 269 *	0.69986E-01	0.00000E+00	0.30439E+00
* 270 *	0.94876E-01	0.21246E+00	0.87141E-01
* 271 *	0.94876E-01	0.15796E+00	0.15796E+00
* 272 *	0.94876E-01	0.87141E-01	0.21246E+00
* 273 *	0.94876E-01	0.00000E+00	0.25064E+00
* 274 *	0.11467E+00	0.14521E+00	0.80763E-01
* 275 *	0.11467E+00	0.80763E-01	0.14521E+00
* 276 *	0.11467E+00	0.00000E+00	0.19333E+00
* 277 *	0.12937E+00	0.74386E-01	0.74386E-01
* 278 *	0.12937E+00	0.00000E+00	0.13245E+00
* 279 *	0.13897E+00	0.00000E+00	0.68008E-01
* 280 *	0.69986E-01	-0.93519E-01	0.27616E+00
* 281 *	0.69986E-01	-0.17072E+00	0.23160E+00
* 282 *	0.69986E-01	-0.23160E+00	0.17072E+00
* 283 *	0.69986E-01	-0.27616E+00	0.93519E-01
* 284 *	0.94876E-01	-0.87141E-01	0.21246E+00
* 285 *	0.94876E-01	-0.15796E+00	0.15796E+00
* 286 *	0.94876E-01	-0.21246E+00	0.87141E-01
* 287 *	0.11467E+00	-0.80763E-01	0.14521E+00
* 288 *	0.11467E+00	-0.14521E+00	0.80763E-01
* 289 *	0.12937E+00	-0.74386E-01	0.74386E-01
* 290 *	-0.69986E-01	-0.30439E+00	0.00000E+00
* 291 *	-0.69986E-01	-0.27616E+00	-0.93519E-01
* 292 *	-0.69986E-01	-0.23160E+00	-0.17072E+00
* 293 *	-0.69986E-01	-0.17072E+00	-0.23160E+00
* 294 *	-0.69986E-01	-0.93519E-01	-0.27616E+00
* 295 *	-0.69986E-01	0.00000E+00	-0.30439E+00
* 296 *	-0.94876E-01	-0.25064E+00	0.00000E+00
* 297 *	-0.94876E-01	-0.21246E+00	-0.87141E-01
* 298 *	-0.94876E-01	-0.15796E+00	-0.15796E+00
* 299 *	-0.94876E-01	-0.87141E-01	-0.21246E+00
* 300 *	-0.94876E-01	0.00000E+00	-0.25064E+00
* 301 *	-0.11467E+00	-0.19333E+00	0.00000E+00
* 302 *	-0.11467E+00	-0.14521E+00	-0.80763E-01
* 303 *	-0.11467E+00	-0.80763E-01	-0.14521E+00
* 304 *	-0.11467E+00	0.00000E+00	-0.19333E+00
* 305 *	-0.12937E+00	-0.13245E+00	0.00000E+00
* 306 *	-0.12937E+00	-0.74386E-01	-0.74386E-01
* 307 *	-0.12937E+00	0.00000E+00	-0.13245E+00
* 308 *	-0.13897E+00	-0.68008E-01	0.00000E+00
* 309 *	-0.13897E+00	0.00000E+00	-0.68008E-01
* 310 *	-0.14348E+00	0.00000E+00	0.00000E+00
* 311 *	-0.69986E-01	0.93519E-01	-0.27616E+00
* 312 *	-0.69986E-01	0.17072E+00	-0.23160E+00
* 313 *	-0.69986E-01	0.23160E+00	-0.17072E+00
* 314 *	-0.69986E-01	0.27616E+00	-0.93519E-01
* 315 *	-0.69986E-01	0.30439E+00	0.00000E+00
* 316 *	-0.94876E-01	0.87141E-01	-0.21246E+00
* 317 *	-0.94876E-01	0.15796E+00	-0.15796E+00
* 318 *	-0.94876E-01	0.21246E+00	-0.87141E-01

*	319	*	-0.94876E-01	0.25064E+00	0.00000E+00
*	320	*	-0.11467E+00	0.80763E-01	-0.14521E+00
*	321	*	-0.11467E+00	0.14521E+00	-0.80763E-01
*	322	*	-0.11467E+00	0.19333E+00	0.00000E+00
*	323	*	-0.12937E+00	0.74386E-01	-0.74386E-01
*	324	*	-0.12937E+00	0.13245E+00	0.00000E+00
*	325	*	-0.13897E+00	0.68008E-01	0.00000E+00
*	326	*	-0.69986E-01	0.27616E+00	0.93519E-01
*	327	*	-0.69986E-01	0.23160E+00	0.17072E+00
*	328	*	-0.69986E-01	0.17072E+00	0.23160E+00
*	329	*	-0.69986E-01	0.93519E-01	0.27616E+00
*	330	*	-0.69986E-01	0.00000E+00	0.30439E+00
*	331	*	-0.94876E-01	0.21246E+00	0.87141E-01
*	332	*	-0.94876E-01	0.15796E+00	0.15796E+00
*	333	*	-0.94876E-01	0.87141E-01	0.21246E+00
*	334	*	-0.94876E-01	0.00000E+00	0.25064E+00
*	335	*	-0.11467E+00	0.14521E+00	0.80763E-01
*	336	*	-0.11467E+00	0.80763E-01	0.14521E+00
*	337	*	-0.11467E+00	0.00000E+00	0.19333E+00
*	338	*	-0.12937E+00	0.74386E-01	0.74386E-01
*	339	*	-0.12937E+00	0.00000E+00	0.13245E+00
*	340	*	-0.13897E+00	0.00000E+00	0.68008E-01
*	341	*	-0.69986E-01	-0.93519E-01	0.27616E+00
*	342	*	-0.69986E-01	-0.17072E+00	0.23160E+00
*	343	*	-0.69986E-01	-0.23160E+00	0.17072E+00
*	344	*	-0.69986E-01	-0.27616E+00	0.93519E-01
*	345	*	-0.94876E-01	-0.87141E-01	0.21246E+00
*	346	*	-0.94876E-01	-0.15796E+00	0.15796E+00
*	347	*	-0.94876E-01	-0.21246E+00	0.87141E-01
*	348	*	-0.11467E+00	-0.80763E-01	0.14521E+00
*	349	*	-0.11467E+00	-0.14521E+00	0.80763E-01
*	350	*	-0.12937E+00	-0.74386E-01	0.74386E-01
*	351	*	-0.14348E+00	0.00000E+00	0.00000E+00
*	352	*	0.14348E+00	0.00000E+00	0.00000E+00
*	353	*	-0.13897E+00	0.00000E+00	-0.68008E-01
*	354	*	0.13897E+00	0.00000E+00	-0.68008E-01
*	355	*	-0.13897E+00	0.68008E-01	0.00000E+00
*	356	*	0.13897E+00	0.68008E-01	0.00000E+00
*	357	*	-0.13897E+00	-0.68008E-01	0.00000E+00
*	358	*	0.13897E+00	-0.68008E-01	0.00000E+00
*	359	*	-0.13897E+00	0.00000E+00	0.68008E-01
*	360	*	0.13897E+00	0.00000E+00	0.68008E-01
*	361	*	-0.12937E+00	0.74386E-01	-0.74386E-01
*	362	*	0.12937E+00	0.74386E-01	-0.74386E-01
*	363	*	-0.12937E+00	-0.74386E-01	-0.74386E-01
*	364	*	0.12937E+00	-0.74386E-01	-0.74386E-01
*	365	*	-0.12937E+00	0.74386E-01	0.74386E-01
*	366	*	0.12937E+00	0.74386E-01	0.74386E-01
*	367	*	-0.12937E+00	-0.74386E-01	0.74386E-01
*	368	*	0.12937E+00	-0.74386E-01	0.74386E-01
*	369	*	-0.12937E+00	0.00000E+00	-0.13245E+00
*	370	*	0.12937E+00	0.00000E+00	-0.13245E+00
*	371	*	-0.12937E+00	0.13245E+00	0.00000E+00
*	372	*	0.12937E+00	0.13245E+00	0.00000E+00
*	373	*	-0.12937E+00	-0.13245E+00	0.00000E+00
*	374	*	0.12937E+00	-0.13245E+00	0.00000E+00
*	375	*	-0.12937E+00	0.00000E+00	0.13245E+00
*	376	*	0.12937E+00	0.00000E+00	0.13245E+00
*	377	*	-0.11467E+00	0.80763E-01	-0.14521E+00
*	378	*	0.11467E+00	0.80763E-01	-0.14521E+00
*	379	*	-0.11467E+00	-0.80763E-01	-0.14521E+00
*	380	*	0.11467E+00	-0.80763E-01	-0.14521E+00
*	381	*	-0.11467E+00	0.14521E+00	-0.80763E-01
*	382	*	0.11467E+00	0.14521E+00	-0.80763E-01
*	383	*	-0.11467E+00	-0.14521E+00	-0.80763E-01
*	384	*	0.11467E+00	-0.14521E+00	-0.80763E-01
*	385	*	-0.11467E+00	0.14521E+00	0.80763E-01
*	386	*	0.11467E+00	0.14521E+00	0.80763E-01
*	387	*	-0.11467E+00	-0.14521E+00	0.80763E-01

* 388 *	0.11467E+00	-0.14521E+00	0.80763E-01
* 389 *	-0.11467E+00	0.80763E-01	0.14521E+00
* 390 *	0.11467E+00	0.80763E-01	0.14521E+00
* 391 *	-0.11467E+00	-0.80763E-01	0.14521E+00
* 392 *	0.11467E+00	-0.80763E-01	0.14521E+00
* 393 *	-0.11467E+00	0.00000E+00	-0.19333E+00
* 394 *	0.11467E+00	0.00000E+00	-0.19333E+00
* 395 *	-0.11467E+00	0.19333E+00	0.00000E+00
* 396 *	0.11467E+00	0.19333E+00	0.00000E+00
* 397 *	-0.11467E+00	-0.19333E+00	0.00000E+00
* 398 *	0.11467E+00	-0.19333E+00	0.00000E+00
* 399 *	-0.11467E+00	0.00000E+00	0.19333E+00
* 400 *	0.11467E+00	0.00000E+00	0.19333E+00
* 401 *	-0.24011E+00	0.00000E+00	0.00000E+00
* 402 *	0.24011E+00	0.00000E+00	0.00000E+00
* 403 *	-0.94876E-01	0.15796E+00	-0.15796E+00
* 404 *	0.94876E-01	0.15796E+00	-0.15796E+00
* 405 *	-0.94876E-01	-0.15796E+00	-0.15796E+00
* 406 *	0.94876E-01	-0.15796E+00	-0.15796E+00
* 407 *	-0.94876E-01	0.15796E+00	0.15796E+00
* 408 *	0.94876E-01	0.15796E+00	0.15796E+00
* 409 *	-0.94876E-01	-0.15796E+00	0.15796E+00
* 410 *	0.94876E-01	-0.15796E+00	0.15796E+00
* 411 *	-0.94876E-01	0.87141E-01	-0.21246E+00
* 412 *	0.94876E-01	0.87141E-01	-0.21246E+00
* 413 *	-0.94876E-01	-0.87141E-01	-0.21246E+00
* 414 *	0.94876E-01	-0.87141E-01	-0.21246E+00
* 415 *	-0.94876E-01	0.21246E+00	-0.87141E-01
* 416 *	0.94876E-01	0.21246E+00	-0.87141E-01
* 417 *	-0.94876E-01	-0.21246E+00	-0.87141E-01
* 418 *	0.94876E-01	-0.21246E+00	-0.87141E-01
* 419 *	-0.94876E-01	0.21246E+00	0.87141E-01
* 420 *	0.94876E-01	0.21246E+00	0.87141E-01
* 421 *	-0.94876E-01	-0.21246E+00	0.87141E-01
* 422 *	0.94876E-01	-0.21246E+00	0.87141E-01
* 423 *	-0.94876E-01	0.87141E-01	0.21246E+00
* 424 *	0.94876E-01	0.87141E-01	0.21246E+00
* 425 *	-0.94876E-01	-0.87141E-01	0.21246E+00
* 426 *	0.94876E-01	-0.87141E-01	0.21246E+00
* 427 *	-0.22519E+00	0.00000E+00	-0.13245E+00
* 428 *	0.22519E+00	0.00000E+00	-0.13245E+00
* 429 *	-0.22519E+00	0.13245E+00	0.00000E+00
* 430 *	0.22519E+00	0.13245E+00	0.00000E+00
* 431 *	-0.22519E+00	-0.13245E+00	0.00000E+00
* 432 *	0.22519E+00	-0.13245E+00	0.00000E+00
* 433 *	-0.22519E+00	0.00000E+00	0.13245E+00
* 434 *	0.22519E+00	0.00000E+00	0.13245E+00
* 435 *	-0.94876E-01	0.00000E+00	-0.25064E+00
* 436 *	0.94876E-01	0.00000E+00	-0.25064E+00
* 437 *	-0.94876E-01	0.25064E+00	0.00000E+00
* 438 *	0.94876E-01	0.25064E+00	0.00000E+00
* 439 *	-0.94876E-01	-0.25064E+00	0.00000E+00
* 440 *	0.94876E-01	-0.25064E+00	0.00000E+00
* 441 *	-0.94876E-01	0.00000E+00	0.25064E+00
* 442 *	0.94876E-01	0.00000E+00	0.25064E+00
* 443 *	-0.18798E+00	0.15796E+00	-0.15796E+00
* 444 *	0.18798E+00	0.15796E+00	-0.15796E+00
* 445 *	-0.18798E+00	-0.15796E+00	-0.15796E+00
* 446 *	0.18798E+00	-0.15796E+00	-0.15796E+00
* 447 *	-0.18798E+00	0.15796E+00	0.15796E+00
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* 449 *	-0.18798E+00	-0.15796E+00	0.15796E+00
* 450 *	0.18798E+00	-0.15796E+00	0.15796E+00
* 451 *	-0.69986E-01	0.17072E+00	-0.23160E+00
* 452 *	0.69986E-01	0.17072E+00	-0.23160E+00
* 453 *	-0.69986E-01	-0.17072E+00	-0.23160E+00
* 454 *	0.69986E-01	-0.17072E+00	-0.23160E+00
* 455 *	-0.69986E-01	0.23160E+00	-0.17072E+00
* 456 *	0.69986E-01	0.23160E+00	-0.17072E+00

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* 457 * -0.69986E-01 -0.23160E+00 -0.17072E+00
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* 459 * -0.69986E-01 0.23160E+00 0.17072E+00
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* 464 * 0.69986E-01 0.17072E+00 0.23160E+00
* 465 * -0.69986E-01 -0.17072E+00 0.23160E+00
* 466 * 0.69986E-01 -0.17072E+00 0.23160E+00
* 467 * -0.69986E-01 0.93519E-01 -0.27616E+00
* 468 * 0.69986E-01 0.93519E-01 -0.27616E+00
* 469 * -0.69986E-01 -0.93519E-01 -0.27616E+00
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* 473 * -0.69986E-01 -0.27616E+00 -0.93519E-01
* 474 * 0.69986E-01 -0.27616E+00 -0.93519E-01
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* 483 * -0.69986E-01 0.00000E+00 -0.30439E+00
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* 491 * -0.18798E+00 0.00000E+00 -0.25064E+00
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* 499 * -0.33674E+00 0.00000E+00 0.00000E+00
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* 501 * -0.32102E+00 0.74386E-01 -0.74386E-01
* 502 * 0.32102E+00 0.74386E-01 -0.74386E-01
* 503 * -0.32102E+00 -0.74386E-01 -0.74386E-01
* 504 * 0.32102E+00 -0.74386E-01 -0.74386E-01
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* 506 * 0.32102E+00 0.74386E-01 0.74386E-01
* 507 * -0.32102E+00 -0.74386E-01 0.74386E-01
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* 517 * -0.30408E+00 0.80763E-01 -0.14521E+00
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* 520 * 0.30408E+00 -0.80763E-01 -0.14521E+00
* 521 * -0.30408E+00 0.14521E+00 -0.80763E-01
* 522 * 0.30408E+00 0.14521E+00 -0.80763E-01
* 523 * -0.30408E+00 -0.14521E+00 -0.80763E-01
* 524 * 0.30408E+00 -0.14521E+00 -0.80763E-01
* 525 * -0.30408E+00 0.14521E+00 0.80763E-01

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* 526	*	0.30408E+00	0.14521E+00	0.80763E-01
* 527	*	-0.30408E+00	-0.14521E+00	0.80763E-01
* 528	*	0.30408E+00	-0.14521E+00	0.80763E-01
* 529	*	-0.30408E+00	0.80763E-01	0.14521E+00
* 530	*	0.30408E+00	0.80763E-01	0.14521E+00
* 531	*	-0.30408E+00	-0.80763E-01	0.14521E+00
* 532	*	0.30408E+00	-0.80763E-01	0.14521E+00
* 533	*	-0.32102E+00	0.00000E+00	-0.13245E+00
* 534	*	0.32102E+00	0.00000E+00	-0.13245E+00
* 535	*	-0.32102E+00	0.13245E+00	0.00000E+00
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* 537	*	-0.32102E+00	-0.13245E+00	0.00000E+00
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* 539	*	-0.32102E+00	0.00000E+00	0.13245E+00
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* 541	*	-0.40000E-01	0.99897E-01	-0.33628E+00
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* 545	*	-0.40000E-01	0.33628E+00	-0.99897E-01
* 546	*	0.40000E-01	0.33628E+00	-0.99897E-01
* 547	*	-0.40000E-01	-0.33628E+00	-0.99897E-01
* 548	*	0.40000E-01	-0.33628E+00	-0.99897E-01
* 549	*	-0.40000E-01	0.33628E+00	0.99897E-01
* 550	*	0.40000E-01	0.33628E+00	0.99897E-01
* 551	*	-0.40000E-01	-0.33628E+00	0.99897E-01
* 552	*	0.40000E-01	-0.33628E+00	0.99897E-01
* 553	*	-0.40000E-01	0.99897E-01	0.33628E+00
* 554	*	0.40000E-01	0.99897E-01	0.33628E+00
* 555	*	-0.40000E-01	-0.99897E-01	0.33628E+00
* 556	*	0.40000E-01	-0.99897E-01	0.33628E+00
* 557	*	-0.40000E-01	0.18347E+00	-0.30167E+00
* 558	*	0.40000E-01	0.18347E+00	-0.30167E+00
* 559	*	-0.40000E-01	-0.30167E+00	-0.18347E+00
* 560	*	0.40000E-01	-0.30167E+00	-0.18347E+00
* 561	*	-0.40000E-01	0.30167E+00	0.18347E+00
* 562	*	0.40000E-01	0.30167E+00	0.18347E+00
* 563	*	-0.40000E-01	-0.18347E+00	0.30167E+00
* 564	*	0.40000E-01	-0.18347E+00	0.30167E+00
* 565	*	-0.40000E-01	0.18347E+00	-0.30167E+00
* 566	*	0.40000E-01	0.18347E+00	-0.30167E+00
* 567	*	-0.40000E-01	0.30167E+00	-0.18347E+00
* 568	*	0.40000E-01	0.30167E+00	-0.18347E+00
* 569	*	-0.40000E-01	-0.30167E+00	0.18347E+00
* 570	*	0.40000E-01	-0.30167E+00	0.18347E+00
* 571	*	-0.40000E-01	0.18347E+00	0.30167E+00
* 572	*	0.40000E-01	0.18347E+00	0.30167E+00
* 573	*	-0.40000E-01	0.00000E+00	-0.35458E+00
* 574	*	0.40000E-01	0.00000E+00	-0.35458E+00
* 575	*	-0.40000E-01	0.35458E+00	0.00000E+00
* 576	*	0.40000E-01	0.35458E+00	0.00000E+00
* 577	*	-0.40000E-01	-0.35458E+00	0.00000E+00
* 578	*	0.40000E-01	-0.35458E+00	0.00000E+00
* 579	*	-0.40000E-01	0.00000E+00	0.35458E+00
* 580	*	0.40000E-01	0.00000E+00	0.35458E+00
* 581	*	-0.40000E-01	0.25073E+00	-0.25073E+00
* 582	*	0.40000E-01	0.25073E+00	-0.25073E+00
* 583	*	-0.40000E-01	-0.25073E+00	-0.25073E+00
* 584	*	0.40000E-01	-0.25073E+00	-0.25073E+00
* 585	*	-0.40000E-01	0.25073E+00	0.25073E+00
* 586	*	0.40000E-01	0.25073E+00	0.25073E+00
* 587	*	-0.40000E-01	-0.25073E+00	0.25073E+00
* 588	*	0.40000E-01	-0.25073E+00	0.25073E+00
* 589	*	-0.28109E+00	0.15796E+00	-0.15796E+00
* 590	*	0.28109E+00	0.15796E+00	-0.15796E+00
* 591	*	-0.28109E+00	-0.15796E+00	-0.15796E+00
* 592	*	0.28109E+00	-0.15796E+00	-0.15796E+00
* 593	*	-0.28109E+00	0.15796E+00	0.15796E+00
* 594	*	0.28109E+00	0.15796E+00	0.15796E+00

* 595 *	-0.28109E+00	-0.15796E+00	0.15796E+00
* 596 *	0.28109E+00	-0.15796E+00	0.15796E+00
* 597 *	-0.30408E+00	0.00000E+00	-0.19333E+00
* 598 *	0.30408E+00	0.00000E+00	-0.19333E+00
* 599 *	-0.30408E+00	0.19333E+00	0.00000E+00
* 600 *	0.30408E+00	0.19333E+00	0.00000E+00
* 601 *	-0.30408E+00	-0.19333E+00	0.00000E+00
* 602 *	0.30408E+00	-0.19333E+00	0.00000E+00
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* 604 *	0.30408E+00	0.00000E+00	0.19333E+00
* 605 *	-0.28109E+00	0.87141E-01	-0.21246E+00
* 606 *	0.28109E+00	0.87141E-01	-0.21246E+00
* 607 *	-0.28109E+00	-0.87141E-01	-0.21246E+00
* 608 *	0.28109E+00	-0.87141E-01	-0.21246E+00
* 609 *	-0.28109E+00	0.21246E+00	-0.87141E-01
* 610 *	0.28109E+00	0.21246E+00	-0.87141E-01
* 611 *	-0.28109E+00	-0.21246E+00	-0.87141E-01
* 612 *	0.28109E+00	-0.21246E+00	-0.87141E-01
* 613 *	-0.28109E+00	0.21246E+00	0.87141E-01
* 614 *	0.28109E+00	0.21246E+00	0.87141E-01
* 615 *	-0.28109E+00	-0.21246E+00	0.87141E-01
* 616 *	0.28109E+00	-0.21246E+00	0.87141E-01
* 617 *	-0.28109E+00	0.87141E-01	0.21246E+00
* 618 *	0.28109E+00	0.87141E-01	0.21246E+00
* 619 *	-0.28109E+00	-0.87141E-01	0.21246E+00
* 620 *	0.28109E+00	-0.87141E-01	0.21246E+00
* 621 *	-0.12848E+00	0.18347E+00	-0.30167E+00
* 622 *	0.12848E+00	0.18347E+00	-0.30167E+00
* 623 *	-0.12848E+00	-0.30167E+00	-0.18347E+00
* 624 *	0.12848E+00	-0.30167E+00	-0.18347E+00
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* 626 *	0.12848E+00	0.30167E+00	0.18347E+00
* 627 *	-0.12848E+00	-0.18347E+00	0.30167E+00
* 628 *	0.12848E+00	-0.18347E+00	0.30167E+00
* 629 *	-0.12848E+00	-0.18347E+00	-0.30167E+00
* 630 *	0.12848E+00	-0.18347E+00	-0.30167E+00
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* 633 *	-0.12848E+00	-0.30167E+00	0.18347E+00
* 634 *	0.12848E+00	-0.30167E+00	0.18347E+00
* 635 *	-0.12848E+00	0.18347E+00	0.30167E+00
* 636 *	0.12848E+00	0.18347E+00	0.30167E+00
* 637 *	-0.28109E+00	0.00000E+00	-0.25064E+00
* 638 *	0.28109E+00	0.00000E+00	-0.25064E+00
* 639 *	-0.28109E+00	0.25064E+00	0.00000E+00
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* 643 *	-0.28109E+00	0.00000E+00	0.25064E+00
* 644 *	0.28109E+00	0.00000E+00	0.25064E+00
* 645 *	-0.12848E+00	0.00000E+00	-0.35458E+00
* 646 *	0.12848E+00	0.00000E+00	-0.35458E+00
* 647 *	-0.12848E+00	0.35458E+00	0.00000E+00
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* 652 *	0.12848E+00	0.00000E+00	0.35458E+00
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* 654 *	0.40000E-01	0.19497E+00	-0.32056E+00
* 655 *	-0.40000E-01	-0.19497E+00	-0.32056E+00
* 656 *	0.40000E-01	-0.19497E+00	-0.32056E+00
* 657 *	-0.40000E-01	-0.32056E+00	-0.19497E+00
* 658 *	0.40000E-01	-0.32056E+00	-0.19497E+00
* 659 *	-0.40000E-01	0.32056E+00	-0.19497E+00
* 660 *	0.40000E-01	0.32056E+00	-0.19497E+00
* 661 *	-0.40000E-01	-0.32056E+00	0.19497E+00
* 662 *	0.40000E-01	-0.32056E+00	0.19497E+00
* 663 *	-0.40000E-01	0.32056E+00	0.19497E+00

* 664 *	0.40000E-01	0.32056E+00	0.19497E+00
* 665 *	-0.40000E-01	0.19497E+00	0.32056E+00
* 666 *	0.40000E-01	0.19497E+00	0.32056E+00
* 667 *	-0.40000E-01	-0.19497E+00	0.32056E+00
* 668 *	0.40000E-01	-0.19497E+00	0.32056E+00
* 669 *	-0.40000E-01	0.00000E+00	-0.37679E+00
* 670 *	0.40000E-01	0.00000E+00	-0.37679E+00
* 671 *	-0.40000E-01	0.37679E+00	0.00000E+00
* 672 *	0.40000E-01	0.37679E+00	0.00000E+00
* 673 *	-0.40000E-01	-0.37679E+00	0.00000E+00
* 674 *	0.40000E-01	-0.37679E+00	0.00000E+00
* 675 *	-0.40000E-01	0.00000E+00	0.37679E+00
* 676 *	0.40000E-01	0.00000E+00	0.37679E+00
* 677 *	-0.25205E+00	0.17072E+00	-0.23160E+00
* 678 *	0.25205E+00	0.17072E+00	-0.23160E+00
* 679 *	-0.25205E+00	-0.17072E+00	-0.23160E+00
* 680 *	0.25205E+00	-0.17072E+00	-0.23160E+00
* 681 *	-0.25205E+00	0.23160E+00	-0.17072E+00
* 682 *	0.25205E+00	0.23160E+00	-0.17072E+00
* 683 *	-0.25205E+00	-0.23160E+00	-0.17072E+00
* 684 *	0.25205E+00	-0.23160E+00	-0.17072E+00
* 685 *	-0.25205E+00	0.23160E+00	0.17072E+00
* 686 *	0.25205E+00	0.23160E+00	0.17072E+00
* 687 *	-0.25205E+00	-0.23160E+00	0.17072E+00
* 688 *	0.25205E+00	-0.23160E+00	0.17072E+00
* 689 *	-0.25205E+00	0.17072E+00	0.23160E+00
* 690 *	0.25205E+00	0.17072E+00	0.23160E+00
* 691 *	-0.25205E+00	-0.17072E+00	0.23160E+00
* 692 *	0.25205E+00	-0.17072E+00	0.23160E+00
* 693 *	-0.25205E+00	0.93519E-01	-0.27616E+00
* 694 *	0.25205E+00	0.93519E-01	-0.27616E+00
* 695 *	-0.25205E+00	-0.93519E-01	-0.27616E+00
* 696 *	0.25205E+00	-0.93519E-01	-0.27616E+00
* 697 *	-0.25205E+00	0.93519E-01	0.27616E+00
* 698 *	0.25205E+00	0.93519E-01	0.27616E+00
* 699 *	-0.25205E+00	-0.93519E-01	0.27616E+00
* 700 *	0.25205E+00	-0.93519E-01	0.27616E+00
* 701 *	-0.25205E+00	0.27616E+00	-0.93519E-01
* 702 *	0.25205E+00	0.27616E+00	-0.93519E-01
* 703 *	-0.25205E+00	-0.27616E+00	-0.93519E-01
* 704 *	0.25205E+00	-0.27616E+00	-0.93519E-01
* 705 *	-0.25205E+00	0.27616E+00	0.93519E-01
* 706 *	0.25205E+00	0.27616E+00	0.93519E-01
* 707 *	-0.25205E+00	-0.27616E+00	0.93519E-01
* 708 *	0.25205E+00	-0.27616E+00	0.93519E-01
* 709 *	-0.25205E+00	0.00000E+00	-0.30439E+00
* 710 *	0.25205E+00	0.00000E+00	-0.30439E+00
* 711 *	-0.25205E+00	0.30439E+00	0.00000E+00
* 712 *	0.25205E+00	0.30439E+00	0.00000E+00
* 713 *	-0.25205E+00	-0.30439E+00	0.00000E+00
* 714 *	0.25205E+00	-0.30439E+00	0.00000E+00
* 715 *	-0.25205E+00	0.00000E+00	0.30439E+00
* 716 *	0.25205E+00	0.00000E+00	0.30439E+00
* 717 *	-0.40000E-01	0.11241E+00	-0.37841E+00
* 718 *	0.40000E-01	0.11241E+00	-0.37841E+00
* 719 *	-0.40000E-01	-0.11241E+00	-0.37841E+00
* 720 *	0.40000E-01	-0.11241E+00	-0.37841E+00
* 721 *	-0.40000E-01	0.37841E+00	-0.11241E+00
* 722 *	0.40000E-01	0.37841E+00	-0.11241E+00
* 723 *	-0.40000E-01	-0.37841E+00	-0.11241E+00
* 724 *	0.40000E-01	-0.37841E+00	-0.11241E+00
* 725 *	-0.40000E-01	0.37841E+00	0.11241E+00
* 726 *	0.40000E-01	0.37841E+00	0.11241E+00
* 727 *	-0.40000E-01	-0.37841E+00	0.11241E+00
* 728 *	0.40000E-01	-0.37841E+00	0.11241E+00
* 729 *	-0.40000E-01	0.11241E+00	0.37841E+00
* 730 *	0.40000E-01	0.11241E+00	0.37841E+00
* 731 *	-0.40000E-01	-0.11241E+00	0.37841E+00
* 732 *	0.40000E-01	-0.11241E+00	0.37841E+00

* 733 *	0.00000E+00	0.20646E+00	-0.33946E+00
* 734 *	0.00000E+00	-0.33946E+00	-0.20646E+00
* 735 *	0.00000E+00	0.33946E+00	0.20646E+00
* 736 *	0.00000E+00	-0.20646E+00	0.33946E+00
* 737 *	0.00000E+00	-0.20646E+00	-0.33946E+00
* 738 *	0.00000E+00	0.33946E+00	-0.20646E+00
* 739 *	0.00000E+00	-0.33946E+00	0.20646E+00
* 740 *	0.00000E+00	0.20646E+00	0.33946E+00
* 741 *	0.00000E+00	0.00000E+00	-0.39900E+00
* 742 *	0.00000E+00	0.39900E+00	0.00000E+00
* 743 *	0.00000E+00	-0.39900E+00	0.00000E+00
* 744 *	0.00000E+00	0.00000E+00	0.39900E+00
* 745 *	-0.40000E-01	0.20646E+00	-0.33946E+00
* 746 *	0.40000E-01	0.20646E+00	-0.33946E+00
* 747 *	-0.40000E-01	-0.20646E+00	-0.33946E+00
* 748 *	0.40000E-01	-0.20646E+00	-0.33946E+00
* 749 *	-0.40000E-01	-0.33946E+00	-0.20646E+00
* 750 *	0.40000E-01	-0.33946E+00	-0.20646E+00
* 751 *	-0.40000E-01	0.33946E+00	-0.20646E+00
* 752 *	0.40000E-01	0.33946E+00	-0.20646E+00
* 753 *	-0.40000E-01	-0.33946E+00	0.20646E+00
* 754 *	0.40000E-01	-0.33946E+00	0.20646E+00
* 755 *	-0.40000E-01	0.33946E+00	0.20646E+00
* 756 *	0.40000E-01	0.33946E+00	0.20646E+00
* 757 *	-0.40000E-01	0.20646E+00	0.33946E+00
* 758 *	0.40000E-01	0.20646E+00	0.33946E+00
* 759 *	-0.40000E-01	-0.20646E+00	0.33946E+00
* 760 *	0.40000E-01	-0.20646E+00	0.33946E+00
* 761 *	-0.40000E-01	0.00000E+00	-0.39900E+00
* 762 *	0.40000E-01	0.00000E+00	-0.39900E+00
* 763 *	-0.40000E-01	0.39900E+00	0.00000E+00
* 764 *	0.40000E-01	0.39900E+00	0.00000E+00
* 765 *	-0.40000E-01	-0.39900E+00	0.00000E+00
* 766 *	0.40000E-01	-0.39900E+00	0.00000E+00
* 767 *	-0.40000E-01	0.00000E+00	0.39900E+00
* 768 *	0.40000E-01	0.00000E+00	0.39900E+00
* 769 *	-0.40000E-01	0.28214E+00	-0.28214E+00
* 770 *	0.40000E-01	0.28214E+00	-0.28214E+00
* 771 *	-0.40000E-01	-0.28214E+00	-0.28214E+00
* 772 *	0.40000E-01	-0.28214E+00	-0.28214E+00
* 773 *	-0.40000E-01	0.28214E+00	0.28214E+00
* 774 *	0.40000E-01	0.28214E+00	0.28214E+00
* 775 *	-0.40000E-01	-0.28214E+00	0.28214E+00
* 776 *	0.40000E-01	-0.28214E+00	0.28214E+00
* 777 *	-0.21696E+00	0.99897E-01	-0.33628E+00
* 778 *	0.21696E+00	0.99897E-01	-0.33628E+00
* 779 *	-0.21696E+00	-0.99897E-01	-0.33628E+00
* 780 *	0.21696E+00	-0.99897E-01	-0.33628E+00
* 781 *	-0.21696E+00	0.33628E+00	-0.99897E-01
* 782 *	0.21696E+00	0.33628E+00	-0.99897E-01
* 783 *	-0.21696E+00	-0.33628E+00	-0.99897E-01
* 784 *	0.21696E+00	-0.33628E+00	-0.99897E-01
* 785 *	-0.21696E+00	0.33628E+00	0.99897E-01
* 786 *	0.21696E+00	0.33628E+00	0.99897E-01
* 787 *	-0.21696E+00	-0.33628E+00	0.99897E-01
* 788 *	0.21696E+00	-0.33628E+00	0.99897E-01
* 789 *	-0.21696E+00	0.99897E-01	0.33628E+00
* 790 *	0.21696E+00	0.99897E-01	0.33628E+00
* 791 *	-0.21696E+00	-0.99897E-01	0.33628E+00
* 792 *	0.21696E+00	-0.99897E-01	0.33628E+00
* 793 *	-0.21696E+00	0.18347E+00	-0.30167E+00
* 794 *	0.21696E+00	0.18347E+00	-0.30167E+00
* 795 *	-0.21696E+00	-0.30167E+00	-0.18347E+00
* 796 *	0.21696E+00	-0.30167E+00	-0.18347E+00
* 797 *	-0.21696E+00	0.30167E+00	0.18347E+00
* 798 *	0.21696E+00	0.30167E+00	0.18347E+00
* 799 *	-0.21696E+00	-0.18347E+00	0.30167E+00
* 800 *	0.21696E+00	-0.18347E+00	0.30167E+00
* 801 *	-0.21696E+00	0.18347E+00	-0.30167E+00

* 802 *	0.21696E+00	-0.18347E+00	-0.30167E+00
* 803 *	-0.21696E+00	0.30167E+00	-0.18347E+00
* 804 *	0.21696E+00	0.30167E+00	-0.18347E+00
* 805 *	-0.21696E+00	-0.30167E+00	0.18347E+00
* 806 *	0.21696E+00	-0.30167E+00	0.18347E+00
* 807 *	-0.21696E+00	0.18347E+00	0.30167E+00
* 808 *	0.21696E+00	0.18347E+00	0.30167E+00
* 809 *	-0.21696E+00	0.00000E+00	-0.35458E+00
* 810 *	0.21696E+00	0.00000E+00	-0.35458E+00
* 811 *	-0.21696E+00	0.35458E+00	0.00000E+00
* 812 *	0.21696E+00	0.35458E+00	0.00000E+00
* 813 *	-0.21696E+00	-0.35458E+00	0.00000E+00
* 814 *	0.21696E+00	-0.35458E+00	0.00000E+00
* 815 *	-0.21696E+00	0.00000E+00	0.35458E+00
* 816 *	0.21696E+00	0.00000E+00	0.35458E+00
* 817 *	-0.21696E+00	0.25073E+00	-0.25073E+00
* 818 *	0.21696E+00	0.25073E+00	-0.25073E+00
* 819 *	-0.21696E+00	-0.25073E+00	-0.25073E+00
* 820 *	0.21696E+00	-0.25073E+00	-0.25073E+00
* 821 *	-0.21696E+00	0.25073E+00	0.25073E+00
* 822 *	0.21696E+00	0.25073E+00	0.25073E+00
* 823 *	-0.21696E+00	-0.25073E+00	0.25073E+00
* 824 *	0.21696E+00	-0.25073E+00	0.25073E+00
* 825 *	-0.43337E+00	0.00000E+00	0.00000E+00
* 826 *	0.43337E+00	0.00000E+00	0.00000E+00
* 827 *	-0.37419E+00	0.15796E+00	-0.15796E+00
* 828 *	0.37419E+00	0.15796E+00	-0.15796E+00
* 829 *	-0.37419E+00	-0.15796E+00	-0.15796E+00
* 830 *	0.37419E+00	-0.15796E+00	-0.15796E+00
* 831 *	-0.37419E+00	0.15796E+00	0.15796E+00
* 832 *	0.37419E+00	0.15796E+00	0.15796E+00
* 833 *	-0.37419E+00	-0.15796E+00	0.15796E+00
* 834 *	0.37419E+00	-0.15796E+00	0.15796E+00
* 835 *	-0.41684E+00	0.00000E+00	-0.13245E+00
* 836 *	0.41684E+00	0.00000E+00	-0.13245E+00
* 837 *	-0.41684E+00	0.13245E+00	0.00000E+00
* 838 *	0.41684E+00	0.13245E+00	0.00000E+00
* 839 *	-0.41684E+00	-0.13245E+00	0.00000E+00
* 840 *	0.41684E+00	-0.13245E+00	0.00000E+00
* 841 *	-0.41684E+00	0.00000E+00	0.13245E+00
* 842 *	0.41684E+00	0.00000E+00	0.13245E+00
* 843 *	-0.37419E+00	0.00000E+00	-0.25064E+00
* 844 *	0.37419E+00	0.00000E+00	-0.25064E+00
* 845 *	-0.37419E+00	0.25064E+00	0.00000E+00
* 846 *	0.37419E+00	0.25064E+00	0.00000E+00
* 847 *	-0.37419E+00	-0.25064E+00	0.00000E+00
* 848 *	0.37419E+00	-0.25064E+00	0.00000E+00
* 849 *	-0.37419E+00	0.00000E+00	0.25064E+00
* 850 *	0.37419E+00	0.00000E+00	0.25064E+00
* 851 *	-0.12848E+00	-0.22833E+00	-0.37543E+00
* 852 *	0.12848E+00	-0.22833E+00	-0.37543E+00
* 853 *	-0.12848E+00	0.22833E+00	-0.37543E+00
* 854 *	0.12848E+00	0.22833E+00	-0.37543E+00
* 855 *	-0.12848E+00	-0.37543E+00	-0.22833E+00
* 856 *	0.12848E+00	-0.37543E+00	-0.22833E+00
* 857 *	-0.12848E+00	0.37543E+00	0.22833E+00
* 858 *	0.12848E+00	0.37543E+00	0.22833E+00
* 859 *	-0.12848E+00	-0.22833E+00	0.37543E+00
* 860 *	0.12848E+00	-0.22833E+00	0.37543E+00
* 861 *	-0.12848E+00	0.22833E+00	0.37543E+00
* 862 *	0.12848E+00	0.22833E+00	0.37543E+00
* 863 *	-0.12848E+00	0.37543E+00	-0.22833E+00
* 864 *	0.12848E+00	0.37543E+00	-0.22833E+00
* 865 *	-0.12848E+00	-0.37543E+00	0.22833E+00
* 866 *	0.12848E+00	-0.37543E+00	0.22833E+00
* 867 *	-0.12848E+00	0.00000E+00	-0.44128E+00
* 868 *	0.12848E+00	0.00000E+00	-0.44128E+00
* 869 *	-0.12848E+00	0.44128E+00	0.00000E+00
* 870 *	0.12848E+00	0.44128E+00	0.00000E+00

* 871 *	-0.12848E+00	-0.44128E+00	0.00000E+00
* 872 *	0.12848E+00	-0.44128E+00	0.00000E+00
* 873 *	-0.12848E+00	0.00000E+00	0.44128E+00
* 874 *	0.12848E+00	0.00000E+00	0.44128E+00
* 875 *	0.40000E-01	-0.23996E+00	-0.39454E+00
* 876 *	-0.40000E-01	-0.23996E+00	-0.39454E+00
* 877 *	0.40000E-01	0.23996E+00	-0.39454E+00
* 878 *	-0.40000E-01	0.23996E+00	-0.39454E+00
* 879 *	0.40000E-01	0.39454E+00	-0.23996E+00
* 880 *	-0.40000E-01	0.39454E+00	-0.23996E+00
* 881 *	0.40000E-01	-0.39454E+00	-0.23996E+00
* 882 *	-0.40000E-01	-0.39454E+00	-0.23996E+00
* 883 *	0.40000E-01	0.39454E+00	0.23996E+00
* 884 *	-0.40000E-01	0.39454E+00	0.23996E+00
* 885 *	0.40000E-01	-0.39454E+00	0.23996E+00
* 886 *	-0.40000E-01	-0.39454E+00	0.23996E+00
* 887 *	0.40000E-01	-0.23996E+00	0.39454E+00
* 888 *	-0.40000E-01	-0.23996E+00	0.39454E+00
* 889 *	0.40000E-01	0.23996E+00	0.39454E+00
* 890 *	-0.40000E-01	0.23996E+00	0.39454E+00
* 891 *	-0.40000E-01	0.00000E+00	-0.46375E+00
* 892 *	0.40000E-01	0.00000E+00	-0.46375E+00
* 893 *	-0.40000E-01	0.46375E+00	0.00000E+00
* 894 *	0.40000E-01	0.46375E+00	0.00000E+00
* 895 *	-0.40000E-01	-0.46375E+00	0.00000E+00
* 896 *	0.40000E-01	-0.46375E+00	0.00000E+00
* 897 *	-0.40000E-01	0.00000E+00	0.46375E+00
* 898 *	0.40000E-01	0.00000E+00	0.46375E+00
* 899 *	-0.30544E+00	0.18347E+00	-0.30167E+00
* 900 *	0.30544E+00	0.18347E+00	-0.30167E+00
* 901 *	-0.30544E+00	-0.18347E+00	-0.30167E+00
* 902 *	0.30544E+00	-0.18347E+00	-0.30167E+00
* 903 *	-0.30544E+00	-0.30167E+00	-0.18347E+00
* 904 *	0.30544E+00	-0.30167E+00	-0.18347E+00
* 905 *	-0.30544E+00	0.30167E+00	-0.18347E+00
* 906 *	0.30544E+00	0.30167E+00	-0.18347E+00
* 907 *	-0.30544E+00	0.30167E+00	0.18347E+00
* 908 *	0.30544E+00	0.30167E+00	0.18347E+00
* 909 *	-0.30544E+00	-0.30167E+00	0.18347E+00
* 910 *	0.30544E+00	-0.30167E+00	0.18347E+00
* 911 *	-0.30544E+00	0.18347E+00	0.30167E+00
* 912 *	0.30544E+00	0.18347E+00	0.30167E+00
* 913 *	-0.30544E+00	-0.18347E+00	0.30167E+00
* 914 *	0.30544E+00	-0.18347E+00	0.30167E+00
* 915 *	-0.30544E+00	0.00000E+00	-0.35458E+00
* 916 *	0.30544E+00	0.00000E+00	-0.35458E+00
* 917 *	-0.30544E+00	0.35458E+00	0.00000E+00
* 918 *	0.30544E+00	0.35458E+00	0.00000E+00
* 919 *	-0.30544E+00	-0.35458E+00	0.00000E+00
* 920 *	0.30544E+00	-0.35458E+00	0.00000E+00
* 921 *	-0.30544E+00	0.00000E+00	0.35458E+00
* 922 *	0.30544E+00	0.00000E+00	0.35458E+00
* 923 *	-0.21696E+00	0.21684E+00	-0.35653E+00
* 924 *	0.21696E+00	0.21684E+00	-0.35653E+00
* 925 *	-0.21696E+00	-0.21684E+00	-0.35653E+00
* 926 *	0.21696E+00	-0.21684E+00	-0.35653E+00
* 927 *	-0.21696E+00	-0.35653E+00	-0.21684E+00
* 928 *	0.21696E+00	-0.35653E+00	-0.21684E+00
* 929 *	-0.21696E+00	0.35653E+00	-0.21684E+00
* 930 *	0.21696E+00	0.35653E+00	-0.21684E+00
* 931 *	-0.21696E+00	-0.35653E+00	0.21684E+00
* 932 *	0.21696E+00	-0.35653E+00	0.21684E+00
* 933 *	-0.21696E+00	0.35653E+00	0.21684E+00
* 934 *	0.21696E+00	0.35653E+00	0.21684E+00
* 935 *	-0.21696E+00	0.21684E+00	0.35653E+00
* 936 *	0.21696E+00	0.21684E+00	0.35653E+00
* 937 *	-0.21696E+00	-0.21684E+00	0.35653E+00
* 938 *	0.21696E+00	-0.21684E+00	0.35653E+00
* 939 *	-0.21696E+00	0.00000E+00	-0.41907E+00

*	940	*	0.21696E+00	0.00000E+00	-0.41907E+00
*	941	*	-0.21696E+00	0.41907E+00	0.00000E+00
*	942	*	0.21696E+00	0.41907E+00	0.00000E+00
*	943	*	-0.21696E+00	-0.41907E+00	0.00000E+00
*	944	*	0.21696E+00	-0.41907E+00	0.00000E+00
*	945	*	-0.21696E+00	0.00000E+00	0.41907E+00
*	946	*	0.21696E+00	0.00000E+00	0.41907E+00
*	947	*	-0.46730E+00	0.15796E+00	-0.15796E+00
*	948	*	0.46730E+00	0.15796E+00	-0.15796E+00
*	949	*	-0.46730E+00	-0.15796E+00	-0.15796E+00
*	950	*	0.46730E+00	-0.15796E+00	-0.15796E+00
*	951	*	-0.46730E+00	0.15796E+00	0.15796E+00
*	952	*	0.46730E+00	0.15796E+00	0.15796E+00
*	953	*	-0.46730E+00	-0.15796E+00	0.15796E+00
*	954	*	0.46730E+00	-0.15796E+00	0.15796E+00
*	955	*	-0.46730E+00	0.87141E-01	-0.21246E+00
*	956	*	0.46730E+00	0.87141E-01	-0.21246E+00
*	957	*	-0.46730E+00	-0.87141E-01	-0.21246E+00
*	958	*	0.46730E+00	-0.87141E-01	-0.21246E+00
*	959	*	-0.46730E+00	0.21246E+00	-0.87141E-01
*	960	*	0.46730E+00	0.21246E+00	-0.87141E-01
*	961	*	-0.46730E+00	-0.21246E+00	-0.87141E-01
*	962	*	0.46730E+00	-0.21246E+00	-0.87141E-01
*	963	*	-0.46730E+00	0.21246E+00	0.87141E-01
*	964	*	0.46730E+00	0.21246E+00	0.87141E-01
*	965	*	-0.46730E+00	-0.21246E+00	0.87141E-01
*	966	*	0.46730E+00	-0.21246E+00	0.87141E-01
*	967	*	-0.46730E+00	0.87141E-01	0.21246E+00
*	968	*	0.46730E+00	0.87141E-01	0.21246E+00
*	969	*	-0.46730E+00	-0.87141E-01	0.21246E+00
*	970	*	0.46730E+00	-0.87141E-01	0.21246E+00
*	971	*	-0.49348E+00	0.80763E-01	-0.14521E+00
*	972	*	0.49348E+00	0.80763E-01	-0.14521E+00
*	973	*	-0.49348E+00	-0.80763E-01	-0.14521E+00
*	974	*	0.49348E+00	-0.80763E-01	-0.14521E+00
*	975	*	-0.49348E+00	0.14521E+00	-0.80763E-01
*	976	*	0.49348E+00	0.14521E+00	-0.80763E-01
*	977	*	-0.49348E+00	-0.14521E+00	-0.80763E-01
*	978	*	0.49348E+00	-0.14521E+00	-0.80763E-01
*	979	*	-0.49348E+00	0.14521E+00	0.80763E-01
*	980	*	0.49348E+00	0.14521E+00	0.80763E-01
*	981	*	-0.49348E+00	-0.14521E+00	0.80763E-01
*	982	*	0.49348E+00	-0.14521E+00	0.80763E-01
*	983	*	-0.49348E+00	0.80763E-01	0.14521E+00
*	984	*	0.49348E+00	0.80763E-01	0.14521E+00
*	985	*	-0.49348E+00	-0.80763E-01	0.14521E+00
*	986	*	0.49348E+00	-0.80763E-01	0.14521E+00
*	987	*	-0.43411E+00	0.17072E+00	-0.23160E+00
*	988	*	0.43411E+00	0.17072E+00	-0.23160E+00
*	989	*	-0.43411E+00	-0.17072E+00	-0.23160E+00
*	990	*	0.43411E+00	-0.17072E+00	-0.23160E+00
*	991	*	-0.43411E+00	0.23160E+00	-0.17072E+00
*	992	*	0.43411E+00	0.23160E+00	-0.17072E+00
*	993	*	-0.43411E+00	-0.23160E+00	-0.17072E+00
*	994	*	0.43411E+00	-0.23160E+00	-0.17072E+00
*	995	*	-0.43411E+00	0.23160E+00	0.17072E+00
*	996	*	0.43411E+00	0.23160E+00	0.17072E+00
*	997	*	-0.43411E+00	-0.23160E+00	0.17072E+00
*	998	*	0.43411E+00	-0.23160E+00	0.17072E+00
*	999	*	-0.43411E+00	0.17072E+00	0.23160E+00
*	1000	*	0.43411E+00	0.17072E+00	0.23160E+00
*	1001	*	-0.43411E+00	-0.17072E+00	0.23160E+00
*	1002	*	0.43411E+00	-0.17072E+00	0.23160E+00
*	1003	*	-0.43411E+00	0.93519E-01	-0.27616E+00
*	1004	*	0.43411E+00	0.93519E-01	-0.27616E+00
*	1005	*	-0.43411E+00	-0.93519E-01	-0.27616E+00
*	1006	*	0.43411E+00	-0.93519E-01	-0.27616E+00
*	1007	*	-0.43411E+00	0.27616E+00	-0.93519E-01
*	1008	*	0.43411E+00	0.27616E+00	-0.93519E-01

* 1009 *	-0.43411E+00	-0.27616E+00	-0.93519E-01
* 1010 *	0.43411E+00	-0.27616E+00	-0.93519E-01
* 1011 *	-0.43411E+00	0.27616E+00	0.93519E-01
* 1012 *	0.43411E+00	0.27616E+00	0.93519E-01
* 1013 *	-0.43411E+00	-0.27616E+00	0.93519E-01
* 1014 *	0.43411E+00	-0.27616E+00	0.93519E-01
* 1015 *	-0.43411E+00	0.93519E-01	0.27616E+00
* 1016 *	0.43411E+00	0.93519E-01	0.27616E+00
* 1017 *	-0.43411E+00	-0.93519E-01	0.27616E+00
* 1018 *	0.43411E+00	-0.93519E-01	0.27616E+00
* 1019 *	-0.51266E+00	0.74386E-01	-0.74386E-01
* 1020 *	0.51266E+00	0.74386E-01	-0.74386E-01
* 1021 *	-0.51266E+00	-0.74386E-01	-0.74386E-01
* 1022 *	0.51266E+00	-0.74386E-01	-0.74386E-01
* 1023 *	-0.51266E+00	0.74386E-01	0.74386E-01
* 1024 *	0.51266E+00	0.74386E-01	0.74386E-01
* 1025 *	-0.51266E+00	-0.74386E-01	0.74386E-01
* 1026 *	0.51266E+00	-0.74386E-01	0.74386E-01
* 1027 *	-0.40000E-01	0.14889E+00	-0.50122E+00
* 1028 *	0.40000E-01	0.14889E+00	-0.50122E+00
* 1029 *	-0.40000E-01	-0.50122E+00	-0.14889E+00
* 1030 *	0.40000E-01	-0.50122E+00	-0.14889E+00
* 1031 *	-0.40000E-01	0.50122E+00	0.14889E+00
* 1032 *	0.40000E-01	0.50122E+00	0.14889E+00
* 1033 *	-0.40000E-01	-0.14889E+00	0.50122E+00
* 1034 *	0.40000E-01	-0.14889E+00	0.50122E+00
* 1035 *	-0.40000E-01	-0.14889E+00	-0.50122E+00
* 1036 *	0.40000E-01	-0.14889E+00	-0.50122E+00
* 1037 *	0.40000E-01	0.50122E+00	-0.14889E+00
* 1038 *	-0.40000E-01	0.50122E+00	-0.14889E+00
* 1039 *	-0.40000E-01	-0.50122E+00	0.14889E+00
* 1040 *	0.40000E-01	-0.50122E+00	0.14889E+00
* 1041 *	-0.40000E-01	0.14889E+00	0.50122E+00
* 1042 *	0.40000E-01	0.14889E+00	0.50122E+00
* 1043 *	-0.21696E+00	-0.13623E+00	-0.45861E+00
* 1044 *	0.21696E+00	-0.13623E+00	-0.45861E+00
* 1045 *	-0.21696E+00	0.45861E+00	-0.13623E+00
* 1046 *	0.21696E+00	0.45861E+00	-0.13623E+00
* 1047 *	-0.21696E+00	-0.45861E+00	0.13623E+00
* 1048 *	0.21696E+00	-0.45861E+00	0.13623E+00
* 1049 *	-0.21696E+00	0.13623E+00	0.45861E+00
* 1050 *	0.21696E+00	0.13623E+00	0.45861E+00
* 1051 *	-0.21696E+00	0.13623E+00	-0.45861E+00
* 1052 *	0.21696E+00	0.13623E+00	-0.45861E+00
* 1053 *	-0.21696E+00	-0.45861E+00	-0.13623E+00
* 1054 *	0.21696E+00	-0.45861E+00	-0.13623E+00
* 1055 *	-0.21696E+00	0.45861E+00	0.13623E+00
* 1056 *	0.21696E+00	0.45861E+00	0.13623E+00
* 1057 *	-0.21696E+00	-0.13623E+00	0.45861E+00
* 1058 *	0.21696E+00	-0.13623E+00	0.45861E+00
* 1059 *	-0.30544E+00	-0.22153E+00	-0.36591E+00
* 1060 *	0.30544E+00	-0.22153E+00	-0.36591E+00
* 1061 *	-0.30544E+00	0.36591E+00	-0.22153E+00
* 1062 *	0.30544E+00	0.36591E+00	-0.22153E+00
* 1063 *	-0.30544E+00	-0.36591E+00	0.22153E+00
* 1064 *	0.30544E+00	-0.36591E+00	0.22153E+00
* 1065 *	-0.30544E+00	0.22153E+00	0.36591E+00
* 1066 *	0.30544E+00	0.22153E+00	0.36591E+00
* 1067 *	-0.30544E+00	0.22153E+00	-0.36591E+00
* 1068 *	0.30544E+00	0.22153E+00	-0.36591E+00
* 1069 *	-0.30544E+00	-0.36591E+00	-0.22153E+00
* 1070 *	0.30544E+00	-0.36591E+00	-0.22153E+00
* 1071 *	-0.30544E+00	0.36591E+00	0.22153E+00
* 1072 *	0.30544E+00	0.36591E+00	0.22153E+00
* 1073 *	-0.30544E+00	-0.22153E+00	0.36591E+00
* 1074 *	0.30544E+00	-0.22153E+00	0.36591E+00
* 1075 *	-0.12848E+00	0.26455E+00	-0.43595E+00
* 1076 *	0.12848E+00	0.26455E+00	-0.43595E+00
* 1077 *	-0.12848E+00	-0.26455E+00	-0.43595E+00

* 1078 *	0.12848E+00	-0.26455E+00	-0.43595E+00
* 1079 *	-0.12848E+00	-0.43595E+00	-0.26455E+00
* 1080 *	0.12848E+00	-0.43595E+00	-0.26455E+00
* 1081 *	-0.12848E+00	0.43595E+00	-0.26455E+00
* 1082 *	0.12848E+00	0.43595E+00	-0.26455E+00
* 1083 *	-0.12848E+00	-0.43595E+00	0.26455E+00
* 1084 *	0.12848E+00	-0.43595E+00	0.26455E+00
* 1085 *	-0.12848E+00	0.43595E+00	0.26455E+00
* 1086 *	0.12848E+00	0.43595E+00	0.26455E+00
* 1087 *	-0.12848E+00	-0.26455E+00	0.43595E+00
* 1088 *	0.12848E+00	-0.26455E+00	0.43595E+00
* 1089 *	-0.12848E+00	0.26455E+00	0.43595E+00
* 1090 *	0.12848E+00	0.26455E+00	0.43595E+00
* 1091 *	0.00000E+00	-0.27396E+00	-0.45063E+00
* 1092 *	0.00000E+00	0.27396E+00	-0.45063E+00
* 1093 *	0.00000E+00	0.45063E+00	-0.27396E+00
* 1094 *	0.00000E+00	-0.45063E+00	-0.27396E+00
* 1095 *	0.00000E+00	0.45063E+00	0.27396E+00
* 1096 *	0.00000E+00	-0.45063E+00	0.27396E+00
* 1097 *	0.00000E+00	-0.27396E+00	0.45063E+00
* 1098 *	0.00000E+00	0.27396E+00	0.45063E+00
* 1099 *	-0.39392E+00	0.99897E-01	-0.33628E+00
* 1100 *	0.39392E+00	0.99897E-01	-0.33628E+00
* 1101 *	-0.39392E+00	-0.99897E-01	-0.33628E+00
* 1102 *	0.39392E+00	-0.99897E-01	-0.33628E+00
* 1103 *	-0.39392E+00	0.33628E+00	-0.99897E-01
* 1104 *	0.39392E+00	0.33628E+00	-0.99897E-01
* 1105 *	-0.39392E+00	-0.33628E+00	-0.99897E-01
* 1106 *	0.39392E+00	-0.33628E+00	-0.99897E-01
* 1107 *	-0.39392E+00	0.33628E+00	0.99897E-01
* 1108 *	0.39392E+00	0.33628E+00	0.99897E-01
* 1109 *	-0.39392E+00	-0.33628E+00	0.99897E-01
* 1110 *	0.39392E+00	-0.33628E+00	0.99897E-01
* 1111 *	-0.39392E+00	0.99897E-01	0.33628E+00
* 1112 *	0.39392E+00	0.99897E-01	0.33628E+00
* 1113 *	-0.39392E+00	-0.99897E-01	0.33628E+00
* 1114 *	0.39392E+00	-0.99897E-01	0.33628E+00
* 1115 *	-0.40000E-01	0.27346E+00	-0.44962E+00
* 1116 *	0.40000E-01	0.27346E+00	-0.44962E+00
* 1117 *	-0.40000E-01	-0.27346E+00	-0.44962E+00
* 1118 *	0.40000E-01	-0.27346E+00	-0.44962E+00
* 1119 *	-0.40000E-01	-0.44962E+00	-0.27346E+00
* 1120 *	0.40000E-01	-0.44962E+00	-0.27346E+00
* 1121 *	-0.40000E-01	0.44962E+00	-0.27346E+00
* 1122 *	0.40000E-01	0.44962E+00	-0.27346E+00
* 1123 *	-0.40000E-01	0.44962E+00	0.27346E+00
* 1124 *	0.40000E-01	0.44962E+00	0.27346E+00
* 1125 *	-0.40000E-01	-0.44962E+00	0.27346E+00
* 1126 *	0.40000E-01	-0.44962E+00	0.27346E+00
* 1127 *	-0.40000E-01	0.27346E+00	0.44962E+00
* 1128 *	0.40000E-01	0.27346E+00	0.44962E+00
* 1129 *	-0.40000E-01	-0.27346E+00	0.44962E+00
* 1130 *	0.40000E-01	-0.27346E+00	0.44962E+00
* 1131 *	-0.21696E+00	-0.25021E+00	-0.41140E+00
* 1132 *	0.21696E+00	-0.25021E+00	-0.41140E+00
* 1133 *	-0.21696E+00	0.25021E+00	-0.41140E+00
* 1134 *	0.21696E+00	0.25021E+00	-0.41140E+00
* 1135 *	-0.21696E+00	-0.41140E+00	-0.25021E+00
* 1136 *	0.21696E+00	-0.41140E+00	-0.25021E+00
* 1137 *	-0.21696E+00	0.41140E+00	-0.25021E+00
* 1138 *	0.21696E+00	0.41140E+00	-0.25021E+00
* 1139 *	-0.21696E+00	0.41140E+00	0.25021E+00
* 1140 *	0.21696E+00	0.41140E+00	0.25021E+00
* 1141 *	-0.21696E+00	-0.41140E+00	0.25021E+00
* 1142 *	0.21696E+00	-0.41140E+00	0.25021E+00
* 1143 *	-0.21696E+00	0.25021E+00	0.41140E+00
* 1144 *	0.21696E+00	0.25021E+00	0.41140E+00
* 1145 *	-0.21696E+00	-0.25021E+00	0.41140E+00
* 1146 *	0.21696E+00	-0.25021E+00	0.41140E+00

* 1147 *	-0.39392E+00	0.18347E+00	-0.30167E+00
* 1148 *	0.39392E+00	0.18347E+00	-0.30167E+00
* 1149 *	-0.39392E+00	-0.18347E+00	-0.30167E+00
* 1150 *	0.39392E+00	-0.18347E+00	-0.30167E+00
* 1151 *	-0.39392E+00	-0.30167E+00	-0.18347E+00
* 1152 *	0.39392E+00	-0.30167E+00	-0.18347E+00
* 1153 *	-0.39392E+00	0.30167E+00	-0.18347E+00
* 1154 *	0.39392E+00	0.30167E+00	-0.18347E+00
* 1155 *	-0.39392E+00	0.30167E+00	0.18347E+00
* 1156 *	0.39392E+00	0.30167E+00	0.18347E+00
* 1157 *	-0.39392E+00	-0.30167E+00	0.18347E+00
* 1158 *	0.39392E+00	-0.30167E+00	0.18347E+00
* 1159 *	-0.39392E+00	0.18347E+00	0.30167E+00
* 1160 *	0.39392E+00	0.18347E+00	0.30167E+00
* 1161 *	-0.39392E+00	-0.18347E+00	0.30167E+00
* 1162 *	0.39392E+00	-0.18347E+00	0.30167E+00
* 1163 *	-0.52483E+00	0.00000E+00	-0.68008E-01
* 1164 *	0.52483E+00	0.00000E+00	-0.68008E-01
* 1165 *	-0.52483E+00	0.68008E-01	0.00000E+00
* 1166 *	0.52483E+00	0.68008E-01	0.00000E+00
* 1167 *	-0.52483E+00	-0.68008E-01	0.00000E+00
* 1168 *	0.52483E+00	-0.68008E-01	0.00000E+00
* 1169 *	-0.52483E+00	0.00000E+00	0.68008E-01
* 1170 *	0.52483E+00	0.00000E+00	0.68008E-01
* 1171 *	-0.51266E+00	0.00000E+00	-0.13245E+00
* 1172 *	0.51266E+00	0.00000E+00	-0.13245E+00
* 1173 *	-0.51266E+00	0.13245E+00	0.00000E+00
* 1174 *	0.51266E+00	0.13245E+00	0.00000E+00
* 1175 *	-0.51266E+00	-0.13245E+00	0.00000E+00
* 1176 *	0.51266E+00	-0.13245E+00	0.00000E+00
* 1177 *	-0.51266E+00	0.00000E+00	0.13245E+00
* 1178 *	0.51266E+00	0.00000E+00	0.13245E+00
* 1179 *	-0.12848E+00	0.00000E+00	-0.51419E+00
* 1180 *	0.12848E+00	0.00000E+00	-0.51419E+00
* 1181 *	-0.12848E+00	0.51419E+00	0.00000E+00
* 1182 *	0.12848E+00	0.51419E+00	0.00000E+00
* 1183 *	-0.12848E+00	-0.51419E+00	0.00000E+00
* 1184 *	0.12848E+00	-0.51419E+00	0.00000E+00
* 1185 *	-0.12848E+00	0.00000E+00	0.51419E+00
* 1186 *	0.12848E+00	0.00000E+00	0.51419E+00
* 1187 *	-0.49348E+00	0.00000E+00	-0.19333E+00
* 1188 *	0.49348E+00	0.00000E+00	-0.19333E+00
* 1189 *	-0.49348E+00	0.19333E+00	0.00000E+00
* 1190 *	0.49348E+00	0.19333E+00	0.00000E+00
* 1191 *	-0.49348E+00	-0.19333E+00	0.00000E+00
* 1192 *	0.49348E+00	-0.19333E+00	0.00000E+00
* 1193 *	-0.49348E+00	0.00000E+00	0.19333E+00
* 1194 *	0.49348E+00	0.00000E+00	0.19333E+00
* 1195 *	0.00000E+00	0.00000E+00	-0.53000E+00
* 1196 *	-0.39392E+00	0.00000E+00	-0.35458E+00
* 1197 *	0.39392E+00	0.00000E+00	-0.35458E+00
* 1198 *	0.00000E+00	0.53000E+00	0.00000E+00
* 1199 *	-0.39392E+00	0.35458E+00	0.00000E+00
* 1200 *	0.39392E+00	0.35458E+00	0.00000E+00
* 1201 *	-0.39392E+00	-0.35458E+00	0.00000E+00
* 1202 *	0.39392E+00	-0.35458E+00	0.00000E+00
* 1203 *	0.00000E+00	-0.53000E+00	0.00000E+00
* 1204 *	-0.53000E+00	0.00000E+00	0.00000E+00
* 1205 *	0.53000E+00	0.00000E+00	0.00000E+00
* 1206 *	-0.39392E+00	0.00000E+00	0.35458E+00
* 1207 *	0.39392E+00	0.00000E+00	0.35458E+00
* 1208 *	0.00000E+00	0.00000E+00	0.53000E+00
* 1209 *	0.40000E-01	0.00000E+00	-0.52849E+00
* 1210 *	-0.40000E-01	0.00000E+00	-0.52849E+00
* 1211 *	0.40000E-01	0.52849E+00	0.00000E+00
* 1212 *	-0.40000E-01	0.52849E+00	0.00000E+00
* 1213 *	0.40000E-01	-0.52849E+00	0.00000E+00
* 1214 *	-0.40000E-01	-0.52849E+00	0.00000E+00
* 1215 *	0.40000E-01	0.00000E+00	0.52849E+00

* 1216	*	-0.40000E-01	0.00000E+00	0.52849E+00
* 1217	*	-0.21696E+00	0.00000E+00	-0.48356E+00
* 1218	*	0.21696E+00	0.00000E+00	-0.48356E+00
* 1219	*	-0.21696E+00	0.48356E+00	0.00000E+00
* 1220	*	0.21696E+00	0.48356E+00	0.00000E+00
* 1221	*	-0.21696E+00	-0.48356E+00	0.00000E+00
* 1222	*	0.21696E+00	-0.48356E+00	0.00000E+00
* 1223	*	-0.21696E+00	0.00000E+00	0.48356E+00
* 1224	*	0.21696E+00	0.00000E+00	0.48356E+00
* 1225	*	-0.40000E-01	0.37370E+00	-0.37370E+00
* 1226	*	0.40000E-01	0.37370E+00	-0.37370E+00
* 1227	*	-0.40000E-01	-0.37370E+00	-0.37370E+00
* 1228	*	0.40000E-01	-0.37370E+00	-0.37370E+00
* 1229	*	-0.40000E-01	0.37370E+00	0.37370E+00
* 1230	*	0.40000E-01	0.37370E+00	0.37370E+00
* 1231	*	-0.40000E-01	-0.37370E+00	0.37370E+00
* 1232	*	0.40000E-01	-0.37370E+00	0.37370E+00
* 1233	*	-0.30544E+00	0.00000E+00	-0.43314E+00
* 1234	*	0.30544E+00	0.00000E+00	-0.43314E+00
* 1235	*	-0.21696E+00	0.34193E+00	-0.34193E+00
* 1236	*	0.21696E+00	0.34193E+00	-0.34193E+00
* 1237	*	-0.21696E+00	-0.34193E+00	-0.34193E+00
* 1238	*	0.21696E+00	-0.34193E+00	-0.34193E+00
* 1239	*	-0.30544E+00	0.43314E+00	0.00000E+00
* 1240	*	0.30544E+00	0.43314E+00	0.00000E+00
* 1241	*	-0.30544E+00	-0.43314E+00	0.00000E+00
* 1242	*	0.30544E+00	-0.43314E+00	0.00000E+00
* 1243	*	-0.21696E+00	0.34193E+00	0.34193E+00
* 1244	*	0.21696E+00	0.34193E+00	0.34193E+00
* 1245	*	-0.21696E+00	-0.34193E+00	0.34193E+00
* 1246	*	0.21696E+00	-0.34193E+00	0.34193E+00
* 1247	*	-0.30544E+00	0.00000E+00	0.43314E+00
* 1248	*	0.30544E+00	0.00000E+00	0.43314E+00
* 1249	*	-0.39392E+00	0.25073E+00	-0.25073E+00
* 1250	*	0.39392E+00	0.25073E+00	-0.25073E+00
* 1251	*	-0.39392E+00	-0.25073E+00	-0.25073E+00
* 1252	*	0.39392E+00	-0.25073E+00	-0.25073E+00
* 1253	*	-0.39392E+00	0.25073E+00	0.25073E+00
* 1254	*	0.39392E+00	0.25073E+00	0.25073E+00
* 1255	*	-0.39392E+00	-0.25073E+00	0.25073E+00
* 1256	*	0.39392E+00	-0.25073E+00	0.25073E+00
* 1257	*	-0.43411E+00	0.00000E+00	-0.30439E+00
* 1258	*	0.43411E+00	0.00000E+00	-0.30439E+00
* 1259	*	-0.43411E+00	0.30439E+00	0.00000E+00
* 1260	*	0.43411E+00	0.30439E+00	0.00000E+00
* 1261	*	-0.43411E+00	-0.30439E+00	0.00000E+00
* 1262	*	0.43411E+00	-0.30439E+00	0.00000E+00
* 1263	*	-0.43411E+00	0.00000E+00	0.30439E+00
* 1264	*	0.43411E+00	0.00000E+00	0.30439E+00
* 1265	*	-0.46730E+00	0.00000E+00	-0.25064E+00
* 1266	*	0.46730E+00	0.00000E+00	-0.25064E+00
* 1267	*	-0.46730E+00	0.25064E+00	0.00000E+00
* 1268	*	0.46730E+00	0.25064E+00	0.00000E+00
* 1269	*	-0.46730E+00	-0.25064E+00	0.00000E+00
* 1270	*	0.46730E+00	-0.25064E+00	0.00000E+00
* 1271	*	-0.46730E+00	0.00000E+00	0.25064E+00
* 1272	*	0.46730E+00	0.00000E+00	0.25064E+00
* 1273	*	-0.57152E+00	0.15796E+00	-0.15796E+00
* 1274	*	0.57152E+00	0.15796E+00	-0.15796E+00
* 1275	*	-0.57152E+00	-0.15796E+00	-0.15796E+00
* 1276	*	0.57152E+00	-0.15796E+00	-0.15796E+00
* 1277	*	-0.57152E+00	0.15796E+00	0.15796E+00
* 1278	*	0.57152E+00	0.15796E+00	0.15796E+00
* 1279	*	-0.57152E+00	-0.15796E+00	0.15796E+00
* 1280	*	0.57152E+00	-0.15796E+00	0.15796E+00
* 1281	*	-0.32442E+00	-0.27415E+00	-0.45076E+00
* 1282	*	0.32442E+00	-0.27415E+00	-0.45076E+00
* 1283	*	-0.32442E+00	0.45076E+00	-0.27415E+00
* 1284	*	0.32442E+00	0.45076E+00	-0.27415E+00

* 1285	*	-0.32442E+00	-0.45076E+00	0.27415E+00
* 1286	*	0.32442E+00	-0.45076E+00	0.27415E+00
* 1287	*	-0.32442E+00	0.27415E+00	0.45076E+00
* 1288	*	0.32442E+00	0.27415E+00	0.45076E+00
* 1289	*	-0.32442E+00	0.27415E+00	-0.45076E+00
* 1290	*	0.32442E+00	0.27415E+00	-0.45076E+00
* 1291	*	-0.32442E+00	-0.45076E+00	0.27415E+00
* 1292	*	0.32442E+00	-0.45076E+00	0.27415E+00
* 1293	*	-0.32442E+00	0.45076E+00	0.27415E+00
* 1294	*	0.32442E+00	0.45076E+00	0.27415E+00
* 1295	*	-0.32442E+00	-0.27415E+00	0.45076E+00
* 1296	*	0.32442E+00	-0.27415E+00	0.45076E+00
* 1297	*	-0.51028E+00	0.18347E+00	-0.30167E+00
* 1298	*	0.51028E+00	0.18347E+00	-0.30167E+00
* 1299	*	-0.51028E+00	-0.18347E+00	-0.30167E+00
* 1300	*	0.51028E+00	-0.18347E+00	-0.30167E+00
* 1301	*	-0.51028E+00	-0.30167E+00	-0.18347E+00
* 1302	*	0.51028E+00	-0.30167E+00	-0.18347E+00
* 1303	*	-0.51028E+00	0.30167E+00	-0.18347E+00
* 1304	*	0.51028E+00	0.30167E+00	-0.18347E+00
* 1305	*	-0.51028E+00	0.30167E+00	0.18347E+00
* 1306	*	0.51028E+00	0.30167E+00	0.18347E+00
* 1307	*	-0.51028E+00	-0.30167E+00	0.18347E+00
* 1308	*	0.51028E+00	-0.30167E+00	0.18347E+00
* 1309	*	-0.51028E+00	0.18347E+00	0.30167E+00
* 1310	*	0.51028E+00	0.18347E+00	0.30167E+00
* 1311	*	-0.51028E+00	-0.18347E+00	0.30167E+00
* 1312	*	0.51028E+00	-0.18347E+00	0.30167E+00
* 1313	*	-0.32442E+00	0.00000E+00	-0.52983E+00
* 1314	*	0.32442E+00	0.00000E+00	-0.52983E+00
* 1315	*	-0.32442E+00	0.52983E+00	0.00000E+00
* 1316	*	0.32442E+00	0.52983E+00	0.00000E+00
* 1317	*	-0.32442E+00	-0.52983E+00	0.00000E+00
* 1318	*	0.32442E+00	-0.52983E+00	0.00000E+00
* 1319	*	-0.32442E+00	0.00000E+00	0.52983E+00
* 1320	*	0.32442E+00	0.00000E+00	0.52983E+00
* 1321	*	-0.51028E+00	0.00000E+00	-0.35458E+00
* 1322	*	0.51028E+00	0.00000E+00	-0.35458E+00
* 1323	*	-0.51028E+00	0.35458E+00	0.00000E+00
* 1324	*	0.51028E+00	0.35458E+00	0.00000E+00
* 1325	*	-0.51028E+00	-0.35458E+00	0.00000E+00
* 1326	*	0.51028E+00	-0.35458E+00	0.00000E+00
* 1327	*	-0.51028E+00	0.00000E+00	0.35458E+00
* 1328	*	0.51028E+00	0.00000E+00	0.35458E+00
* 1329	*	-0.40000E-01	-0.32271E+00	-0.53061E+00
* 1330	*	0.40000E-01	-0.32271E+00	-0.53061E+00
* 1331	*	-0.40000E-01	0.32271E+00	-0.53061E+00
* 1332	*	0.40000E-01	0.32271E+00	-0.53061E+00
* 1333	*	-0.40000E-01	-0.53061E+00	-0.32271E+00
* 1334	*	0.40000E-01	-0.53061E+00	-0.32271E+00
* 1335	*	-0.40000E-01	0.53061E+00	-0.32271E+00
* 1336	*	0.40000E-01	0.53061E+00	-0.32271E+00
* 1337	*	-0.40000E-01	-0.53061E+00	0.32271E+00
* 1338	*	0.40000E-01	-0.53061E+00	0.32271E+00
* 1339	*	-0.40000E-01	0.53061E+00	0.32271E+00
* 1340	*	0.40000E-01	0.53061E+00	0.32271E+00
* 1341	*	-0.40000E-01	-0.32271E+00	0.53061E+00
* 1342	*	0.40000E-01	-0.32271E+00	0.53061E+00
* 1343	*	-0.40000E-01	0.32271E+00	0.53061E+00
* 1344	*	0.40000E-01	0.32271E+00	0.53061E+00
* 1345	*	-0.60976E+00	0.00000E+00	-0.13245E+00
* 1346	*	0.60976E+00	0.00000E+00	-0.13245E+00
* 1347	*	-0.60976E+00	0.13245E+00	0.00000E+00
* 1348	*	0.60976E+00	0.13245E+00	0.00000E+00
* 1349	*	-0.60976E+00	-0.13245E+00	0.00000E+00
* 1350	*	0.60976E+00	-0.13245E+00	0.00000E+00
* 1351	*	-0.60976E+00	0.00000E+00	0.13245E+00
* 1352	*	0.60976E+00	0.00000E+00	0.13245E+00
* 1353	*	-0.57152E+00	0.00000E+00	-0.25064E+00

* 1354 *	0.57152E+00	0.00000E+00	-0.25064E+00
* 1355 *	-0.57152E+00	0.25064E+00	0.00000E+00
* 1356 *	0.57152E+00	0.25064E+00	0.00000E+00
* 1357 *	-0.57152E+00	-0.25064E+00	0.00000E+00
* 1358 *	0.57152E+00	-0.25064E+00	0.00000E+00
* 1359 *	-0.57152E+00	0.00000E+00	0.25064E+00
* 1360 *	0.57152E+00	0.00000E+00	0.25064E+00
* 1361 *	0.40000E-01	0.00000E+00	-0.62369E+00
* 1362 *	-0.40000E-01	0.00000E+00	-0.62369E+00
* 1363 *	0.40000E-01	0.62369E+00	0.00000E+00
* 1364 *	-0.40000E-01	0.62369E+00	0.00000E+00
* 1365 *	0.40000E-01	-0.62369E+00	0.00000E+00
* 1366 *	-0.40000E-01	-0.62369E+00	0.00000E+00
* 1367 *	0.40000E-01	0.00000E+00	0.62369E+00
* 1368 *	-0.40000E-01	0.00000E+00	0.62369E+00
* 1369 *	-0.62500E+00	0.00000E+00	0.00000E+00
* 1370 *	0.62500E+00	0.00000E+00	0.00000E+00
* 1371 *	-0.67575E+00	0.15796E+00	-0.15796E+00
* 1372 *	0.67575E+00	0.15796E+00	-0.15796E+00
* 1373 *	-0.67575E+00	-0.15796E+00	-0.15796E+00
* 1374 *	0.67575E+00	-0.15796E+00	-0.15796E+00
* 1375 *	-0.67575E+00	0.15796E+00	0.15796E+00
* 1376 *	0.67575E+00	0.15796E+00	0.15796E+00
* 1377 *	-0.67575E+00	-0.15796E+00	0.15796E+00
* 1378 *	0.67575E+00	-0.15796E+00	0.15796E+00
* 1379 *	-0.26033E+00	0.56673E+00	-0.34296E+00
* 1380 *	0.26033E+00	0.56673E+00	-0.34296E+00
* 1381 *	-0.26033E+00	-0.56673E+00	0.34296E+00
* 1382 *	0.26033E+00	-0.56673E+00	0.34296E+00
* 1383 *	-0.26033E+00	0.34296E+00	-0.56673E+00
* 1384 *	0.26033E+00	0.34296E+00	-0.56673E+00
* 1385 *	-0.26033E+00	-0.34296E+00	-0.56673E+00
* 1386 *	0.26033E+00	-0.34296E+00	-0.56673E+00
* 1387 *	-0.26033E+00	-0.56673E+00	-0.34296E+00
* 1388 *	0.26033E+00	-0.56673E+00	-0.34296E+00
* 1389 *	-0.26033E+00	0.56673E+00	0.34296E+00
* 1390 *	0.26033E+00	0.56673E+00	0.34296E+00
* 1391 *	-0.26033E+00	0.34296E+00	0.56673E+00
* 1392 *	0.26033E+00	0.34296E+00	0.56673E+00
* 1393 *	-0.26033E+00	-0.34296E+00	0.56673E+00
* 1394 *	0.26033E+00	-0.34296E+00	0.56673E+00
* 1395 *	-0.40000E-01	-0.68179E+00	-0.20253E+00
* 1396 *	0.40000E-01	-0.68179E+00	-0.20253E+00
* 1397 *	-0.40000E-01	0.68179E+00	0.20253E+00
* 1398 *	0.40000E-01	0.68179E+00	0.20253E+00
* 1399 *	-0.40000E-01	0.20253E+00	-0.68179E+00
* 1400 *	0.40000E-01	0.20253E+00	-0.68179E+00
* 1401 *	-0.40000E-01	-0.20253E+00	-0.68179E+00
* 1402 *	0.40000E-01	-0.20253E+00	-0.68179E+00
* 1403 *	0.40000E-01	0.68179E+00	-0.20253E+00
* 1404 *	-0.40000E-01	0.68179E+00	-0.20253E+00
* 1405 *	-0.40000E-01	-0.68179E+00	0.20253E+00
* 1406 *	0.40000E-01	-0.68179E+00	0.20253E+00
* 1407 *	-0.40000E-01	0.20253E+00	0.68179E+00
* 1408 *	0.40000E-01	0.20253E+00	0.68179E+00
* 1409 *	-0.40000E-01	-0.20253E+00	0.68179E+00
* 1410 *	0.40000E-01	-0.20253E+00	0.68179E+00
* 1411 *	-0.69356E+00	0.80763E-01	-0.14521E+00
* 1412 *	0.69356E+00	0.80763E-01	-0.14521E+00
* 1413 *	-0.69356E+00	-0.80763E-01	-0.14521E+00
* 1414 *	0.69356E+00	-0.80763E-01	-0.14521E+00
* 1415 *	-0.69356E+00	0.14521E+00	-0.80763E-01
* 1416 *	0.69356E+00	0.14521E+00	-0.80763E-01
* 1417 *	-0.69356E+00	-0.14521E+00	-0.80763E-01
* 1418 *	0.69356E+00	-0.14521E+00	-0.80763E-01
* 1419 *	-0.69356E+00	0.14521E+00	0.80763E-01
* 1420 *	0.69356E+00	0.14521E+00	0.80763E-01
* 1421 *	-0.69356E+00	-0.14521E+00	0.80763E-01
* 1422 *	0.69356E+00	-0.14521E+00	0.80763E-01

* 1423 *	-0.69356E+00	0.80763E-01	0.14521E+00
* 1424 *	0.69356E+00	0.80763E-01	0.14521E+00
* 1425 *	-0.69356E+00	-0.80763E-01	0.14521E+00
* 1426 *	0.69356E+00	-0.80763E-01	0.14521E+00
* 1427 *	-0.67575E+00	0.87141E-01	-0.21246E+00
* 1428 *	0.67575E+00	0.87141E-01	-0.21246E+00
* 1429 *	-0.67575E+00	-0.87141E-01	-0.21246E+00
* 1430 *	0.67575E+00	-0.87141E-01	-0.21246E+00
* 1431 *	-0.67575E+00	0.21246E+00	-0.87141E-01
* 1432 *	0.67575E+00	0.21246E+00	-0.87141E-01
* 1433 *	-0.67575E+00	-0.21246E+00	-0.87141E-01
* 1434 *	0.67575E+00	-0.21246E+00	-0.87141E-01
* 1435 *	-0.67575E+00	0.21246E+00	0.87141E-01
* 1436 *	0.67575E+00	0.21246E+00	0.87141E-01
* 1437 *	-0.67575E+00	-0.21246E+00	0.87141E-01
* 1438 *	0.67575E+00	-0.21246E+00	0.87141E-01
* 1439 *	-0.67575E+00	0.87141E-01	0.21246E+00
* 1440 *	0.67575E+00	0.87141E-01	0.21246E+00
* 1441 *	-0.67575E+00	-0.87141E-01	0.21246E+00
* 1442 *	0.67575E+00	-0.87141E-01	0.21246E+00
* 1443 *	-0.65344E+00	0.17072E+00	-0.23160E+00
* 1444 *	0.65344E+00	0.17072E+00	-0.23160E+00
* 1445 *	-0.65344E+00	-0.17072E+00	-0.23160E+00
* 1446 *	0.65344E+00	-0.17072E+00	-0.23160E+00
* 1447 *	-0.65344E+00	0.17072E+00	0.23160E+00
* 1448 *	0.65344E+00	0.17072E+00	0.23160E+00
* 1449 *	-0.65344E+00	-0.17072E+00	0.23160E+00
* 1450 *	0.65344E+00	-0.17072E+00	0.23160E+00
* 1451 *	-0.65344E+00	0.23160E+00	-0.17072E+00
* 1452 *	0.65344E+00	0.23160E+00	-0.17072E+00
* 1453 *	-0.65344E+00	-0.23160E+00	-0.17072E+00
* 1454 *	0.65344E+00	-0.23160E+00	-0.17072E+00
* 1455 *	-0.65344E+00	0.23160E+00	0.17072E+00
* 1456 *	0.65344E+00	0.23160E+00	0.17072E+00
* 1457 *	-0.65344E+00	-0.23160E+00	0.17072E+00
* 1458 *	0.65344E+00	-0.23160E+00	0.17072E+00
* 1459 *	-0.70687E+00	0.74386E-01	-0.74386E-01
* 1460 *	0.70687E+00	0.74386E-01	-0.74386E-01
* 1461 *	-0.70687E+00	-0.74386E-01	-0.74386E-01
* 1462 *	0.70687E+00	-0.74386E-01	-0.74386E-01
* 1463 *	-0.70687E+00	0.74386E-01	0.74386E-01
* 1464 *	0.70687E+00	0.74386E-01	0.74386E-01
* 1465 *	-0.70687E+00	-0.74386E-01	0.74386E-01
* 1466 *	0.70687E+00	-0.74386E-01	0.74386E-01
* 1467 *	-0.43188E+00	0.16230E+00	-0.54636E+00
* 1468 *	0.43188E+00	0.16230E+00	-0.54636E+00
* 1469 *	-0.43188E+00	-0.16230E+00	-0.54636E+00
* 1470 *	0.43188E+00	-0.16230E+00	-0.54636E+00
* 1471 *	-0.43188E+00	0.54636E+00	-0.16230E+00
* 1472 *	0.43188E+00	0.54636E+00	-0.16230E+00
* 1473 *	-0.43188E+00	-0.54636E+00	-0.16230E+00
* 1474 *	0.43188E+00	-0.54636E+00	-0.16230E+00
* 1475 *	-0.43188E+00	0.54636E+00	0.16230E+00
* 1476 *	0.43188E+00	0.54636E+00	0.16230E+00
* 1477 *	-0.43188E+00	-0.54636E+00	0.16230E+00
* 1478 *	0.43188E+00	-0.54636E+00	0.16230E+00
* 1479 *	-0.43188E+00	0.16230E+00	0.54636E+00
* 1480 *	0.43188E+00	0.16230E+00	0.54636E+00
* 1481 *	-0.43188E+00	-0.16230E+00	0.54636E+00
* 1482 *	0.43188E+00	-0.16230E+00	0.54636E+00
* 1483 *	-0.65344E+00	0.93519E-01	-0.27616E+00
* 1484 *	0.65344E+00	0.93519E-01	-0.27616E+00
* 1485 *	-0.65344E+00	-0.93519E-01	-0.27616E+00
* 1486 *	0.65344E+00	-0.93519E-01	-0.27616E+00
* 1487 *	-0.65344E+00	0.27616E+00	-0.93519E-01
* 1488 *	0.65344E+00	0.27616E+00	-0.93519E-01
* 1489 *	-0.65344E+00	-0.27616E+00	-0.93519E-01
* 1490 *	0.65344E+00	-0.27616E+00	-0.93519E-01
* 1491 *	-0.65344E+00	0.27616E+00	0.93519E-01

* 1492	*	0.65344E+00	0.27616E+00	0.93519E-01
* 1493	*	-0.65344E+00	-0.27616E+00	0.93519E-01
* 1494	*	0.65344E+00	-0.27616E+00	0.93519E-01
* 1495	*	-0.65344E+00	0.93519E-01	0.27616E+00
* 1496	*	0.65344E+00	0.93519E-01	0.27616E+00
* 1497	*	-0.65344E+00	-0.93519E-01	0.27616E+00
* 1498	*	0.65344E+00	-0.93519E-01	0.27616E+00
* 1499	*	0.00000E+00	0.37234E+00	-0.61234E+00
* 1500	*	0.00000E+00	-0.37234E+00	-0.61234E+00
* 1501	*	0.00000E+00	-0.61234E+00	-0.37234E+00
* 1502	*	0.00000E+00	0.61234E+00	-0.37234E+00
* 1503	*	0.00000E+00	-0.61234E+00	0.37234E+00
* 1504	*	0.00000E+00	0.61234E+00	0.37234E+00
* 1505	*	0.00000E+00	0.37234E+00	0.61234E+00
* 1506	*	0.00000E+00	-0.37234E+00	0.61234E+00
* 1507	*	-0.40000E-01	-0.37197E+00	-0.61160E+00
* 1508	*	0.40000E-01	-0.37197E+00	-0.61160E+00
* 1509	*	-0.40000E-01	0.61160E+00	-0.37197E+00
* 1510	*	0.40000E-01	0.61160E+00	-0.37197E+00
* 1511	*	-0.40000E-01	-0.61160E+00	0.37197E+00
* 1512	*	0.40000E-01	-0.61160E+00	0.37197E+00
* 1513	*	-0.40000E-01	0.37197E+00	0.61160E+00
* 1514	*	0.40000E-01	0.37197E+00	0.61160E+00
* 1515	*	-0.40000E-01	0.37197E+00	-0.61160E+00
* 1516	*	0.40000E-01	0.37197E+00	-0.61160E+00
* 1517	*	-0.40000E-01	-0.61160E+00	-0.37197E+00
* 1518	*	0.40000E-01	-0.61160E+00	-0.37197E+00
* 1519	*	-0.40000E-01	0.61160E+00	0.37197E+00
* 1520	*	0.40000E-01	0.61160E+00	0.37197E+00
* 1521	*	-0.40000E-01	-0.37197E+00	0.61160E+00
* 1522	*	0.40000E-01	-0.37197E+00	0.61160E+00
* 1523	*	0.00000E+00	0.00000E+00	-0.72000E+00
* 1524	*	0.40000E-01	0.00000E+00	-0.71889E+00
* 1525	*	-0.40000E-01	0.00000E+00	-0.71889E+00
* 1526	*	-0.26033E+00	0.00000E+00	-0.67129E+00
* 1527	*	0.26033E+00	0.00000E+00	-0.67129E+00
* 1528	*	-0.43188E+00	0.00000E+00	-0.57609E+00
* 1529	*	0.43188E+00	0.00000E+00	-0.57609E+00
* 1530	*	-0.40000E-01	0.50833E+00	-0.50833E+00
* 1531	*	0.40000E-01	0.50833E+00	-0.50833E+00
* 1532	*	-0.40000E-01	-0.50833E+00	-0.50833E+00
* 1533	*	0.40000E-01	-0.50833E+00	-0.50833E+00
* 1534	*	-0.43188E+00	0.29809E+00	-0.49012E+00
* 1535	*	0.43188E+00	0.29809E+00	-0.49012E+00
* 1536	*	-0.43188E+00	-0.29809E+00	-0.49012E+00
* 1537	*	0.43188E+00	-0.29809E+00	-0.49012E+00
* 1538	*	-0.55080E+00	0.00000E+00	-0.46375E+00
* 1539	*	0.55080E+00	0.00000E+00	-0.46375E+00
* 1540	*	-0.43188E+00	0.40736E+00	-0.40736E+00
* 1541	*	0.43188E+00	0.40736E+00	-0.40736E+00
* 1542	*	-0.43188E+00	-0.40736E+00	-0.40736E+00
* 1543	*	0.43188E+00	-0.40736E+00	-0.40736E+00
* 1544	*	-0.55080E+00	0.24025E+00	-0.39484E+00
* 1545	*	0.55080E+00	0.24025E+00	-0.39484E+00
* 1546	*	-0.55080E+00	-0.24025E+00	-0.39484E+00
* 1547	*	0.55080E+00	-0.24025E+00	-0.39484E+00
* 1548	*	-0.62664E+00	0.00000E+00	-0.35458E+00
* 1549	*	0.62664E+00	0.00000E+00	-0.35458E+00
* 1550	*	-0.62664E+00	0.99897E-01	-0.33628E+00
* 1551	*	0.62664E+00	0.99897E-01	-0.33628E+00
* 1552	*	-0.62664E+00	-0.99897E-01	-0.33628E+00
* 1553	*	0.62664E+00	-0.99897E-01	-0.33628E+00
* 1554	*	-0.65344E+00	0.00000E+00	-0.30439E+00
* 1555	*	0.65344E+00	0.00000E+00	-0.30439E+00
* 1556	*	-0.62664E+00	0.18347E+00	-0.30167E+00
* 1557	*	0.62664E+00	0.18347E+00	-0.30167E+00
* 1558	*	-0.62664E+00	-0.18347E+00	-0.30167E+00
* 1559	*	0.62664E+00	-0.18347E+00	-0.30167E+00
* 1560	*	-0.43188E+00	-0.49012E+00	-0.29809E+00

* 1561 *	0.43188E+00	-0.49012E+00	-0.29809E+00
* 1562 *	-0.43188E+00	0.49012E+00	-0.29809E+00
* 1563 *	0.43188E+00	0.49012E+00	-0.29809E+00
* 1564 *	-0.62664E+00	0.25073E+00	-0.25073E+00
* 1565 *	0.62664E+00	0.25073E+00	-0.25073E+00
* 1566 *	-0.62664E+00	-0.25073E+00	-0.25073E+00
* 1567 *	0.62664E+00	-0.25073E+00	-0.25073E+00
* 1568 *	-0.67575E+00	0.00000E+00	-0.25064E+00
* 1569 *	0.67575E+00	0.00000E+00	-0.25064E+00
* 1570 *	-0.55080E+00	-0.39484E+00	-0.24025E+00
* 1571 *	0.55080E+00	-0.39484E+00	-0.24025E+00
* 1572 *	-0.55080E+00	0.39484E+00	-0.24025E+00
* 1573 *	0.55080E+00	0.39484E+00	-0.24025E+00
* 1574 *	-0.69356E+00	0.00000E+00	-0.19333E+00
* 1575 *	0.69356E+00	0.00000E+00	-0.19333E+00
* 1576 *	-0.62664E+00	-0.30167E+00	-0.18347E+00
* 1577 *	0.62664E+00	-0.30167E+00	-0.18347E+00
* 1578 *	-0.62664E+00	0.30167E+00	-0.18347E+00
* 1579 *	0.62664E+00	0.30167E+00	-0.18347E+00
* 1580 *	-0.70687E+00	0.00000E+00	-0.13245E+00
* 1581 *	0.70687E+00	0.00000E+00	-0.13245E+00
* 1582 *	-0.62664E+00	0.33628E+00	-0.99897E-01
* 1583 *	0.62664E+00	0.33628E+00	-0.99897E-01
* 1584 *	-0.62664E+00	-0.33628E+00	-0.99897E-01
* 1585 *	0.62664E+00	-0.33628E+00	-0.99897E-01
* 1586 *	-0.71568E+00	0.00000E+00	-0.68008E-01
* 1587 *	0.71568E+00	0.00000E+00	-0.68008E-01
* 1588 *	0.00000E+00	0.72000E+00	0.00000E+00
* 1589 *	-0.43188E+00	0.57609E+00	0.00000E+00
* 1590 *	0.43188E+00	0.57609E+00	0.00000E+00
* 1591 *	-0.43188E+00	-0.57609E+00	0.00000E+00
* 1592 *	0.43188E+00	-0.57609E+00	0.00000E+00
* 1593 *	0.00000E+00	-0.72000E+00	0.00000E+00
* 1594 *	0.40000E-01	0.71889E+00	0.00000E+00
* 1595 *	-0.40000E-01	0.71889E+00	0.00000E+00
* 1596 *	0.40000E-01	-0.71889E+00	0.00000E+00
* 1597 *	-0.40000E-01	-0.71889E+00	0.00000E+00
* 1598 *	-0.62664E+00	0.35458E+00	0.00000E+00
* 1599 *	0.62664E+00	0.35458E+00	0.00000E+00
* 1600 *	-0.62664E+00	-0.35458E+00	0.00000E+00
* 1601 *	0.62664E+00	-0.35458E+00	0.00000E+00
* 1602 *	-0.55080E+00	0.46375E+00	0.00000E+00
* 1603 *	0.55080E+00	0.46375E+00	0.00000E+00
* 1604 *	-0.55080E+00	-0.46375E+00	0.00000E+00
* 1605 *	0.55080E+00	-0.46375E+00	0.00000E+00
* 1606 *	-0.67575E+00	0.25064E+00	0.00000E+00
* 1607 *	0.67575E+00	0.25064E+00	0.00000E+00
* 1608 *	-0.67575E+00	-0.25064E+00	0.00000E+00
* 1609 *	0.67575E+00	-0.25064E+00	0.00000E+00
* 1610 *	-0.65344E+00	0.30439E+00	0.00000E+00
* 1611 *	0.65344E+00	0.30439E+00	0.00000E+00
* 1612 *	-0.65344E+00	-0.30439E+00	0.00000E+00
* 1613 *	0.65344E+00	-0.30439E+00	0.00000E+00
* 1614 *	-0.70687E+00	0.13245E+00	0.00000E+00
* 1615 *	0.70687E+00	0.13245E+00	0.00000E+00
* 1616 *	-0.70687E+00	-0.13245E+00	0.00000E+00
* 1617 *	0.70687E+00	-0.13245E+00	0.00000E+00
* 1618 *	-0.26033E+00	0.67129E+00	0.00000E+00
* 1619 *	0.26033E+00	0.67129E+00	0.00000E+00
* 1620 *	-0.26033E+00	-0.67129E+00	0.00000E+00
* 1621 *	0.26033E+00	-0.67129E+00	0.00000E+00
* 1622 *	-0.71568E+00	0.68008E-01	0.00000E+00
* 1623 *	0.71568E+00	0.68008E-01	0.00000E+00
* 1624 *	-0.71568E+00	-0.68008E-01	0.00000E+00
* 1625 *	0.71568E+00	-0.68008E-01	0.00000E+00
* 1626 *	-0.69356E+00	0.19333E+00	0.00000E+00
* 1627 *	0.69356E+00	0.19333E+00	0.00000E+00
* 1628 *	-0.72000E+00	0.00000E+00	0.00000E+00
* 1629 *	0.72000E+00	0.00000E+00	0.00000E+00

* 1630	*	-0.69356E+00	-0.19333E+00	0.00000E+00
* 1631	*	0.69356E+00	-0.19333E+00	0.00000E+00
* 1632	*	-0.71568E+00	0.00000E+00	0.68008E-01
* 1633	*	0.71568E+00	0.00000E+00	0.68008E-01
* 1634	*	-0.62664E+00	0.33628E+00	0.99897E-01
* 1635	*	0.62664E+00	0.33628E+00	0.99897E-01
* 1636	*	-0.62664E+00	-0.33628E+00	0.99897E-01
* 1637	*	0.62664E+00	-0.33628E+00	0.99897E-01
* 1638	*	-0.70687E+00	0.00000E+00	0.13245E+00
* 1639	*	0.70687E+00	0.00000E+00	0.13245E+00
* 1640	*	-0.62664E+00	0.30167E+00	0.18347E+00
* 1641	*	0.62664E+00	0.30167E+00	0.18347E+00
* 1642	*	-0.62664E+00	-0.30167E+00	0.18347E+00
* 1643	*	0.62664E+00	-0.30167E+00	0.18347E+00
* 1644	*	-0.69356E+00	0.00000E+00	0.19333E+00
* 1645	*	0.69356E+00	0.00000E+00	0.19333E+00
* 1646	*	-0.55080E+00	-0.39484E+00	0.24025E+00
* 1647	*	0.55080E+00	-0.39484E+00	0.24025E+00
* 1648	*	-0.55080E+00	0.39484E+00	0.24025E+00
* 1649	*	0.55080E+00	0.39484E+00	0.24025E+00
* 1650	*	-0.67575E+00	0.00000E+00	0.25064E+00
* 1651	*	0.67575E+00	0.00000E+00	0.25064E+00
* 1652	*	-0.62664E+00	0.25073E+00	0.25073E+00
* 1653	*	0.62664E+00	0.25073E+00	0.25073E+00
* 1654	*	-0.62664E+00	-0.25073E+00	0.25073E+00
* 1655	*	0.62664E+00	-0.25073E+00	0.25073E+00
* 1656	*	-0.43188E+00	0.49012E+00	0.29809E+00
* 1657	*	0.43188E+00	0.49012E+00	0.29809E+00
* 1658	*	-0.43188E+00	-0.49012E+00	0.29809E+00
* 1659	*	0.43188E+00	-0.49012E+00	0.29809E+00
* 1660	*	-0.62664E+00	0.18347E+00	0.30167E+00
* 1661	*	0.62664E+00	0.18347E+00	0.30167E+00
* 1662	*	-0.62664E+00	-0.18347E+00	0.30167E+00
* 1663	*	0.62664E+00	-0.18347E+00	0.30167E+00
* 1664	*	-0.65344E+00	0.00000E+00	0.30439E+00
* 1665	*	0.65344E+00	0.00000E+00	0.30439E+00
* 1666	*	-0.62664E+00	0.99897E-01	0.33628E+00
* 1667	*	0.62664E+00	0.99897E-01	0.33628E+00
* 1668	*	-0.62664E+00	-0.99897E-01	0.33628E+00
* 1669	*	0.62664E+00	-0.99897E-01	0.33628E+00
* 1670	*	-0.62664E+00	0.00000E+00	0.35458E+00
* 1671	*	0.62664E+00	0.00000E+00	0.35458E+00
* 1672	*	-0.55080E+00	0.24025E+00	0.39484E+00
* 1673	*	0.55080E+00	0.24025E+00	0.39484E+00
* 1674	*	-0.55080E+00	-0.24025E+00	0.39484E+00
* 1675	*	0.55080E+00	-0.24025E+00	0.39484E+00
* 1676	*	-0.43188E+00	0.40736E+00	0.40736E+00
* 1677	*	0.43188E+00	0.40736E+00	0.40736E+00
* 1678	*	-0.43188E+00	-0.40736E+00	0.40736E+00
* 1679	*	0.43188E+00	-0.40736E+00	0.40736E+00
* 1680	*	-0.55080E+00	0.00000E+00	0.46375E+00
* 1681	*	0.55080E+00	0.00000E+00	0.46375E+00
* 1682	*	-0.43188E+00	-0.29809E+00	0.49012E+00
* 1683	*	0.43188E+00	-0.29809E+00	0.49012E+00
* 1684	*	-0.43188E+00	0.29809E+00	0.49012E+00
* 1685	*	0.43188E+00	0.29809E+00	0.49012E+00
* 1686	*	-0.40000E-01	0.50833E+00	0.50833E+00
* 1687	*	0.40000E-01	0.50833E+00	0.50833E+00
* 1688	*	-0.40000E-01	-0.50833E+00	0.50833E+00
* 1689	*	0.40000E-01	-0.50833E+00	0.50833E+00
* 1690	*	-0.43188E+00	0.00000E+00	0.57609E+00
* 1691	*	0.43188E+00	0.00000E+00	0.57609E+00
* 1692	*	-0.26033E+00	0.00000E+00	0.67129E+00
* 1693	*	0.26033E+00	0.00000E+00	0.67129E+00
* 1694	*	-0.40000E-01	0.00000E+00	0.71889E+00
* 1695	*	0.40000E-01	0.00000E+00	0.71889E+00
* 1696	*	0.00000E+00	0.00000E+00	0.72000E+00

ELEMENTS

* 18*	140	142	170	172	161	163	182	184	141	165	166	171	147 &
	148	174	175	162	177	178	183						

HEXA20P	MAVART8D	13											
* 19*	133	186	142	193	154	202	163	209	185	136	190	192	145 &
	197	148	199	201	157	206	208						

HEXA20P	MAVART8D	14											
* 20*	186	188	193	195	202	204	209	211	187	190	191	194	197 &
	198	199	200	203	206	207	210						

HEXA20P	MAVART8D	15											
* 21*	188	1	195	12	204	27	211	38	189	191	8	196	198 &
	19	200	23	205	207	34	212						

HEXA20P	MAVART8D	13											
* 22*	142	193	172	216	163	209	184	225	192	166	213	215	148 &
	199	175	220	208	178	222	224						

HEXA20P	MAVART8D	14											
* 23*	193	195	216	218	209	211	225	227	194	213	214	217	199 &
	200	220	221	210	222	223	226						

HEXA20P	MAVART8D	15											
* 24*	195	12	218	49	211	38	227	64	196	214	45	219	200 &
	23	221	56	212	223	60	228						

SHEL06C	ST4340	1											
* 25*	38	40	235	39	230	229							
* 26*	235	40	237	230	231	236							
* 27*	40	42	237	41	232	231							
* 28*	237	42	239	232	233	238							
* 29*	42	44	239	43	234	233							
* 30*	235	237	244	236	241	240							
* 31*	244	237	246	241	242	245							
* 32*	237	239	246	238	243	242							
* 33*	244	246	249	245	248	247							
* 34*	44	102	239	101	250	234							
* 35*	239	102	256	250	251	255							
* 36*	102	104	256	103	252	251							
* 37*	256	104	258	252	253	257							
* 38*	104	106	258	105	254	253							
* 39*	239	256	246	255	259	243							
* 40*	246	256	263	259	260	262							
* 41*	256	258	263	257	261	260							
* 42*	246	263	249	262	264	248							
* 43*	106	159	258	158	265	254							
* 44*	258	159	271	265	266	270							
* 45*	159	161	271	160	267	266							
* 46*	271	161	273	267	268	272							
* 47*	161	163	273	162	269	268							
* 48*	258	271	263	270	274	261							
* 49*	263	271	278	274	275	277							
* 50*	271	273	278	272	276	275							
* 51*	263	278	249	277	279	264							
* 52*	163	209	273	208	280	269							
* 53*	273	209	285	280	281	284							
* 54*	209	211	285	210	282	281							
* 55*	285	211	235	282	283	286							
* 56*	211	38	235	212	229	283							
* 57*	273	285	278	284	287	276							
* 58*	278	285	244	287	288	289							
* 59*	285	235	244	286	240	288							
* 60*	278	244	249	289	247	279							
* 61*	12	14	296	13	291	290							
* 62*	296	14	298	291	292	297							
* 63*	14	16	298	15	293	292							
* 64*	298	16	300	293	294	299							
* 65*	16	18	300	17	295	294							

* 66*	296	298	305	297	302	301
* 67*	305	298	307	302	303	306
* 68*	298	300	307	299	304	303
* 69*	305	307	310	306	309	308
* 70*	18	81	300	80	311	295
* 71*	300	81	317	311	312	316
* 72*	81	83	317	82	313	312
* 73*	317	83	319	313	314	318
* 74*	83	85	319	84	315	314
* 75*	300	317	307	316	320	304
* 76*	307	317	324	320	321	323
* 77*	317	319	324	318	322	321
* 78*	307	324	310	323	325	309
* 79*	85	138	319	137	326	315
* 80*	319	138	332	326	327	331
* 81*	138	140	332	139	328	327
* 82*	332	140	334	328	329	333
* 83*	140	142	334	141	330	329
* 84*	319	332	324	331	335	322
* 85*	324	332	339	335	336	338
* 86*	332	334	339	333	337	336
* 87*	324	339	310	338	340	325
* 88*	142	193	334	192	341	330
* 89*	334	193	346	341	342	345
* 90*	193	195	346	194	343	342
* 91*	346	195	296	343	344	347
* 92*	195	12	296	196	290	344
* 93*	334	346	339	345	348	337
* 94*	339	346	305	348	349	350
* 95*	346	296	305	347	301	349
* 96*	339	305	310	350	308	340

QUAD08E	FICFIBER	2					
* 97*	1	3	27	29	2	19	20 28
* 98*	3	5	29	31	4	20	21 30
* 99*	5	7	31	33	6	21	22 32
100	7	72	33	93	71	22	86 92
101	72	74	93	95	73	86	87 94
102	74	76	95	97	75	87	88 96
103	76	129	97	150	128	88	143 149
104	129	131	150	152	130	143	144 151
105	131	133	152	154	132	144	145 153
106	133	186	154	202	185	145	197 201
107	186	188	202	204	187	197	198 203
108	188	1	204	27	189	198	19 205

TRIA12I	0										
109	352	370	374	249	246	244	354	364	358	248	245 247
110	374	406	440	244	237	235	384	418	398	241	236 240
111	374	370	406	244	246	237	364	380	384	245	242 241
112	370	436	406	246	239	237	394	414	380	243	238 242
113	440	560	578	235	40	38	474	548	488	230	39 229
114	440	406	560	235	237	40	418	458	474	236	231 230
115	406	566	560	237	42	40	454	584	458	232	41 231
116	406	436	566	237	239	42	414	470	454	238	233 232
117	436	574	566	239	44	42	484	544	470	234	43 233
118	352	372	370	249	263	246	356	362	354	264	262 248
119	370	404	436	246	256	239	378	412	394	259	255 243
120	370	372	404	246	263	256	362	382	378	262	260 259
121	372	438	404	263	258	256	396	416	382	261	257 260
122	436	558	574	239	102	44	468	542	484	250	101 234
123	436	404	558	239	256	102	412	452	468	255	251 250
124	404	568	558	256	104	102	456	582	452	252	103 251
125	404	438	568	256	258	104	416	472	456	257	253 252
126	438	576	568	258	106	104	486	546	472	254	105 253
127	352	376	372	249	278	263	360	366	356	279	277 264
128	372	408	438	263	271	258	386	420	396	274	270 261
129	372	376	408	263	278	271	366	390	386	277	275 274
130	376	442	408	278	273	271	400	424	390	276	272 275

131	438	562	576	258	159	106	476	550	486	265	158	254
132	438	408	562	258	271	159	420	460	476	270	266	265
133	408	572	562	271	161	159	464	586	460	267	160	266
134	408	442	572	271	273	161	424	480	464	272	268	267
135	442	580	572	273	163	161	490	554	480	269	162	268
136	352	374	376	249	244	278	358	368	360	247	289	279
137	376	410	442	278	285	273	392	426	400	287	284	276
138	376	374	410	278	244	285	368	388	392	289	288	287
139	374	440	410	244	235	285	398	422	388	240	286	288
140	442	564	580	273	209	163	482	556	490	280	208	269
141	442	410	564	273	285	209	426	466	482	284	281	280
142	410	570	564	285	211	209	462	588	466	282	210	281
143	410	440	570	285	235	211	422	478	462	286	283	282
144	440	578	570	235	38	211	448	552	478	229	212	283
145	369	373	351	307	305	310	363	357	353	306	308	309
146	435	405	369	300	298	307	413	379	393	299	303	304
147	369	405	373	307	298	305	379	383	363	303	302	306
148	405	439	373	298	296	305	417	397	383	297	301	302
149	573	565	435	18	16	300	543	469	483	17	294	295
150	435	565	405	300	16	298	469	453	413	294	293	299
151	565	559	405	16	14	298	583	457	453	15	292	293
152	405	559	439	298	14	296	457	473	417	292	291	297
153	559	577	439	14	12	296	547	487	473	13	290	291
154	371	369	351	324	307	310	361	353	355	323	309	325
155	437	403	371	319	317	324	415	381	395	318	321	322
156	371	403	369	324	317	307	381	377	361	321	320	323
157	403	435	369	317	300	307	411	393	377	316	304	320
158	575	567	437	85	83	319	545	471	485	84	314	315
159	437	567	403	319	83	317	471	455	415	314	313	318
160	567	557	403	83	81	317	581	451	455	82	312	313
161	403	557	435	317	81	300	451	467	411	312	311	316
162	557	573	435	81	18	300	541	483	467	80	295	311
163	375	371	351	339	324	310	365	355	359	338	325	340
164	441	407	375	334	332	339	423	389	399	333	336	337
165	375	407	371	339	332	324	389	385	365	336	335	338
166	407	437	371	332	319	324	419	395	385	331	322	335
167	579	571	441	142	140	334	553	479	489	141	329	330
168	441	571	407	334	140	332	479	463	423	329	328	333
169	571	561	407	140	138	332	585	459	463	139	327	328
170	407	561	437	332	138	319	459	475	419	327	326	331
171	561	575	437	138	85	319	549	485	475	137	315	326
172	373	375	351	305	339	310	367	359	357	350	340	308
173	439	409	373	296	346	305	421	387	397	347	349	301
174	373	409	375	305	346	339	387	391	367	349	348	350
175	409	441	375	346	334	339	425	399	391	345	337	348
176	577	569	439	12	195	296	551	477	487	196	344	290
177	439	569	409	296	195	346	477	461	421	344	343	347
178	569	563	409	195	193	346	587	465	461	194	342	343
179	409	563	441	346	193	334	465	481	425	342	341	345
180	563	579	441	193	142	334	555	489	481	192	330	341

QUAD16I

181	560	578	750	766	40	38	29	27	548	658	674	724	39 &
	35	34	28										
182	566	560	748	750	42	40	31	29	584	656	658	772	41 &
	36	35	30										
183	574	566	762	748	44	42	33	31	544	670	656	720	43 &
	37	36	32										
184	558	574	746	762	102	44	93	33	542	654	670	718	101 &
	98	37	92										
185	568	558	752	746	104	102	95	93	582	660	654	770	103 &
	99	98	94										
186	576	568	764	752	106	104	97	95	546	672	660	722	105 &
	100	99	96										
187	562	576	756	764	159	106	150	97	550	664	672	726	158 &
	155	100	149										
188	572	562	758	756	161	159	152	150	586	666	664	774	160 &
	156	155	151										
189	580	572	768	758	163	161	154	152	554	676	666	730	162 &

[illegible]

223	406	370	374	592	534	538	380	364	384	446	428	432	520	&
	504	524												
224	406	436	370	592	638	534	414	394	380	446	492	428	608	&
	596	520												
225	374	370	352	538	534	500	364	354	358	432	428	402	504	&
	510	514												
226	574	558	436	810	794	638	542	468	484	646	622	492	778	&
	694	710												
227	558	404	436	794	590	638	452	412	468	622	444	492	678	&
	606	694												
228	558	568	404	794	804	590	582	456	452	622	632	444	818	&
	682	678												
229	568	438	404	804	640	590	472	416	456	632	494	444	702	&
	610	682												
230	568	576	438	804	812	640	546	486	472	632	648	494	782	&
	712	702												
231	436	404	370	638	590	534	412	378	394	492	444	428	606	&
	518	598												
232	404	372	370	590	536	534	382	362	378	444	430	428	522	&
	502	518												
233	404	438	372	590	640	536	416	396	382	444	494	430	610	&
	600	522												
234	370	372	352	534	536	500	362	356	354	428	430	402	502	&
	512	510												
235	576	562	438	812	798	640	550	476	486	648	626	494	786	&
	706	712												
236	562	408	438	798	594	640	460	420	476	626	448	494	686	&
	614	706												
237	562	572	408	798	808	594	586	464	460	626	636	448	822	&
	690	686												
238	572	442	408	808	644	594	480	424	464	636	498	448	698	&
	618	690												
239	572	580	442	808	816	644	554	490	480	636	652	498	790	&
	716	698												
240	438	408	372	640	594	536	420	386	396	494	448	430	614	&
	526	600												
241	408	376	372	594	540	536	390	366	386	448	434	430	530	&
	506	526												
242	408	442	376	594	644	540	424	400	390	448	498	434	618	&
	604	530												
243	372	376	352	536	540	500	366	360	356	430	434	402	506	&
	516	512												
244	580	564	442	816	800	644	556	482	490	652	628	498	792	&
	700	716												
245	564	410	442	800	596	644	466	426	482	628	450	498	692	&
	620	700												
246	564	570	410	800	806	596	588	462	466	628	634	450	824	&
	688	692												
247	570	440	410	806	642	596	478	422	462	634	496	450	708	&
	616	688												
248	570	578	440	806	814	642	552	488	478	634	650	496	788	&
	714	708												
249	442	410	376	644	596	540	426	392	400	498	450	434	620	&
	532	604												
250	410	374	376	596	538	540	388	368	392	450	432	434	528	&
	508	532												
251	410	440	374	596	642	538	422	398	388	450	496	432	616	&
	602	528												
252	376	374	352	540	538	500	368	358	360	434	432	402	508	&
	514	516												
253	814	796	642	1202	1152	1270	784	704	714	920	904	848	1106	&
	1010	1262												
254	796	592	642	1152	950	1270	684	612	704	904	830	848	994	&
	962	1010												
255	796	802	592	1152	1150	950	820	680	684	904	902	830	1252	&
	990	994												
256	802	638	592	1150	1266	950	696	608	680	902	844	830	1006	&
	958	990												
257	802	810	638	1150	1197	1266	780	710	696	902	916	844	1102	&

[illegible]

292	801	637	591	565	435	405	695	607	679	629	491	445	469	&
	413	453												
293	801	809	637	565	573	435	779	709	695	629	645	491	543	&
	483	469												
294	641	591	537	439	405	373	611	523	601	495	445	431	417	&
	383	397												
295	591	533	537	405	369	373	519	503	523	445	427	431	379	&
	363	383												
296	591	637	533	405	435	369	607	597	519	445	491	427	413	&
	393	379												
297	537	533	499	373	369	351	503	509	513	431	427	401	363	&
	353	357												
298	809	793	637	573	557	435	777	693	709	645	621	491	541	&
	467	483												
299	793	589	637	557	403	435	677	605	693	621	443	491	451	&
	411	467												
300	793	803	589	557	567	403	817	681	677	621	631	443	581	&
	455	451												
301	803	639	589	567	437	403	701	609	681	631	493	443	471	&
	415	455												
302	803	811	639	567	575	437	781	711	701	631	647	493	545	&
	485	471												
303	637	589	533	435	403	369	605	517	597	491	443	427	411	&
	377	393												
304	589	535	533	403	371	369	521	501	517	443	429	427	381	&
	361	377												
305	589	639	535	403	437	371	609	599	521	443	493	429	415	&
	395	381												
306	533	535	499	369	371	351	501	511	509	427	429	401	361	&
	355	353												
307	811	797	639	575	561	437	785	705	711	647	625	493	549	&
	475	485												
308	797	593	639	561	407	437	685	613	705	625	447	493	459	&
	419	475												
309	797	807	593	561	571	407	821	689	685	625	635	447	585	&
	463	459												
310	807	643	593	571	441	407	697	617	689	635	497	447	479	&
	423	463												
311	807	815	643	571	579	441	789	715	697	635	651	497	553	&
	489	479												
312	639	593	535	437	407	371	613	525	599	493	447	429	419	&
	385	395												
313	593	539	535	407	375	371	529	505	525	447	433	429	389	&
	365	385												
314	593	643	539	407	441	375	617	603	529	447	497	433	423	&
	399	389												
315	535	539	499	371	375	351	505	515	511	429	433	401	365	&
	359	355												
316	815	799	643	579	563	441	791	699	715	651	627	497	555	&
	481	489												
317	799	595	643	563	409	441	691	619	699	627	449	497	465	&
	425	481												
318	799	805	595	563	569	409	823	687	691	627	633	449	587	&
	461	465												
319	805	641	595	569	439	409	707	615	687	633	495	449	477	&
	421	461												
320	805	813	641	569	577	439	787	713	707	633	649	495	551	&
	487	477												
321	643	595	539	441	409	375	619	531	603	497	449	433	425	&
	391	399												
322	595	537	539	409	373	375	527	507	531	449	431	433	387	&
	367	391												
323	595	641	537	409	439	373	615	601	527	449	495	431	421	&
	397	387												
324	539	537	499	375	373	351	507	513	515	433	431	401	367	&
	357	359												
325	1201	1151	1269	813	795	641	1105	1009	1261	919	903	847	783	&
	703	713												
326	1151	949	1269	795	591	641	993	961	1009	903	829	847	683	&

	611	703												
327	1151	1149	949	795	801	591	1251	989	993	903	901	829	819	&
	679	683												
328	1149	1265	949	801	637	591	1005	957	989	901	843	829	695	&
	607	679												
329	1149	1196	1265	801	809	637	1101	1257	1005	901	915	843	779	&
	709	695												
330	1269	969	1175	641	591	537	961	977	1191	847	829	839	611	&
	523	601												
331	949	1171	1175	591	533	537	973	1021	977	829	835	839	519	&
	503	523												
332	949	1265	1171	591	637	533	957	1187	973	829	843	835	607	&
	597	519												
333	1175	1171	1204	537	533	499	1021	1163	1167	839	835	825	503	&
	509	513												
334	1196	1147	1265	809	793	637	1099	1003	1257	915	899	843	777	&
	693	709												
335	1147	967	1265	793	589	637	987	955	1003	899	827	843	677	&
	605	693												
336	1147	1153	947	793	803	589	1249	991	987	899	905	827	817	&
	681	677												
337	1153	1267	947	803	639	589	1007	959	991	905	845	827	701	&
	609	681												
338	1153	1199	1267	803	811	639	1103	1259	1007	905	917	845	781	&
	711	701												
339	1265	947	1171	637	589	533	955	971	1187	843	827	835	605	&
	517	597												
340	947	1173	1171	589	535	533	975	1019	971	827	837	835	521	&
	501	517												
341	947	1267	1173	589	639	535	959	1189	975	827	845	837	609	&
	599	521												
342	1171	1173	1204	533	535	499	1019	1165	1163	835	837	825	501	&
	511	509												
343	1199	1155	1267	811	797	639	1107	1011	1259	917	907	845	785	&
	705	711												
344	1155	951	1267	797	593	639	995	963	1011	907	831	845	685	&
	613	705												
345	1155	1159	951	797	807	593	1253	999	995	907	911	831	821	&
	689	685												
346	1159	1271	951	807	643	593	1015	967	999	911	849	831	697	&
	617	689												
347	1159	1206	1271	807	815	643	1							

361	1202	1222	814	1152	1136	796	1242	944	920	1106	1054	784	1070	&
	928	904												
362	1152	1136	796	1150	1132	802	1070	928	904	1252	1238	820	1060	&
	926	902												
363	1150	1132	802	1197	1218	810	1060	926	902	1102	1044	780	1234	&
	940	916												
364	1197	1218	810	1148	1134	794	1234	940	916	1100	1052	778	1068	&
	924	900												
365	1148	1134	794	1154	1138	804	1068	924	900	1250	1236	818	1062	&
	930	906												
366	1154	1138	804	1200	1220	812	1062	930	906	1104	1046	782	1240	&
	942	918												
367	1200	1220	812	1156	1140	798	1240	942	918	1108	1056	786	1072	&
	934	908												
368	1156	1140	798	1160	1144	808	1072	934	908	1254	1244	822	1066	&
	936	912												
369	1160	1144	808	1207	1224	816	1066	936	912	1112	1050	790	1248	&
	946	922												
370	1207	1224	816	1162	1146	800	1248	946	922	1114	1058	792	1074	&
	938	914												
371	1162	1146	800	1158	1142	806	1074	938	914	1256	1246	824	1064	&
	932	910												
372	1158	1142	806	1202	1222	814	1064	932	910	1110	1048	788	1242	&
	944	920												
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	881	856												
374	1136	1120	750	1132	1118	748	1080	881	856	1238	1228	772	1078	&
	875	852												
375	1132	1118	748	1218	1209	762	1078	875	852	1044	1036	720	1180	&
	892	868												
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	877	854												
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	879	864												
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	894	870												
379	1220	1211	764	1140	1124	756	1182	894	870	1056	1032	726	1086	&
	883	858												
380	1140	1124	756	1144	1128	758	1086	883	858	1244	1230	774	1090	&
	889	862												
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	898	874												
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	887	860												
383	1146	1130	760	1142	1126	754	1088	887	860	1246	1232	776	1084	&
	885	866												
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	896	872												
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	855	882												
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	851	876												
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	867	891												
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	853	878												
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	863	880												
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	869	893												
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	857	884												
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	861	890												
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	873	897												
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	859	888												
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	859	651	627	731	675	667	555							
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	865	627	633	775	667	661	587							
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	871	633	649	727	661	673	551							

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	1484	1555												
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602	1376	1651 1639 1440 1645 1424
603	1615	1639 1629 1464 1633 1623
604	1671	1663 1651 1669 1498 1665
605	1651	1663 1378 1498 1450 1442
606	1663	1643 1378 1655 1458 1450
607	1378	1643 1609 1458 1494 1438
608	1643	1601 1609 1637 1613 1494
609	1651	1378 1639 1442 1426 1645
610	1639	1378 1617 1426 1422 1466
611	1378	1609 1617 1438 1631 1422
612	1639	1617 1629 1466 1625 1633
613	1600	1576 1608 1584 1489 1612
614	1608	1576 1373 1489 1453 1433
615	1576	1558 1373 1566 1445 1453
616	1373	1558 1568 1445 1485 1429
617	1558	1548 1568 1552 1554 1485
618	1608	1373 1616 1433 1417 1630
619	1616	1373 1580 1417 1413 1461

620	1373	1568	1580	1429	1574	1413
621	1616	1580	1628	1461	1586	1624
622	1548	1556	1568	1550	1483	1554
623	1568	1556	1371	1483	1443	1427
624	1556	1578	1371	1564	1451	1443
625	1371	1578	1606	1451	1487	1431
626	1578	1598	1606	1582	1610	1487
627	1568	1371	1580	1427	1411	1574
628	1580	1371	1614	1411	1415	1459
629	1371	1606	1614	1431	1626	1415
630	1580	1614	1628	1459	1622	1586
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632	1606	1640	1375	1491	1455	1435
633	1640	1660	1375	1652	1447	1455
634	1375	1660	1650	1447	1495	1439
635	1660	1670	1650	1666	1664	1495
636	1606	1375	1614	1435	1419	1626
637	1614	1375	1638	1419	1423	1463
638	1375	1650	1638	1439	1644	1423
639	1614	1638	1628	1463	1632	1622
640	1670	1662	1650	1668	1497	1664
641	1650	1662	1377	1497	1449	1441
642	1662	1642	1377	1654	1457	1449
643	1377	1642	1608	1457	1493	1437
644	1642	1600	1608	1636	1612	1493
645	1650	1377	1638	1441	1425	1644
646	1638	1377	1616	1425	1421	1465
647	1377	1608	1616	1437	1630	1421
648	1638	1616	1628	1465	1624	1632

QUAD08R	EAU	3				
649	1592	1561	1601	1577	1474	1605 1571 1585
650	1561	1537	1577	1559	1543	1571 1547 1567
651	1537	1529	1559	1549	1470	1547 1539 1553
652	1529	1535	1549	1557	1468	1539 1545 1551
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654	1563	1590	1579	1599	1472	1573 1603 1583
655	1590	1657	1599	1641	1476	1603 1649 1635
656	1657	1685	1641	1661	1677	1649 1673 1653
657	1685	1691	1661	1671	1480	1673 1681 1667
658	1691	1683	1671	1663	1482	1681 1675 1669
659	1683	1659	1663	1643	1679	1675 1647 1655
660	1659	1592	1643	1601	1478	1647 1605 1637
661	1596	1518	1592	1561	1396	1621 1388 1474
662	1518	1508	1561	1537	1533	1388 1386 1543
663	1508	1524	1537	1529	1402	1386 1527 1470
664	1524	1516	1529	1535	1400	1527 1384 1468
665	1516	1510	1535	1563	1531	1384 1380 1541
666	1510	1594	1563	1590	1403	1380 1619 1472
667	1594	1520	1590	1657	1398	1619 1390 1476
668	1520	1514	1657	1685	1687	1390 1392 1677
669	1514	1694	1685	1691	1408	1392 1693 1480
670	1694	1522	1691	1683	1410	1693 1394 1482
671	1522	1512	1683	1659	1689	1394 1382 1679
672	1512	1596	1659	1592	1406	1382 1621 1478
673	1597	1517	1596	1518	1395	1593 1501 1396
674	1517	1507	1518	1508	1532	1501 1500 1533
675	1507	1525	1508	1524	1401	1500 1523 1402
676	1525	1515	1524	1516	1399	1523 1499 1400
677	1515	1509	1516	1510	1530	1499 1502 1531
678	1509	1595	1510	1594	1404	1502 1588 1403
679	1595	1519	1594	1520	1397	1588 1504 1398
680	1519	1513	1520	1514	1686	1504 1505 1687
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682	1695	1521	1694	1522	1409	1696 1506 1410
683	1521	1511	1522	1512	1688	1506 1503 1689
684	1511	1597	1512	1596	1405	1503 1593 1406
685	1591	1560	1597	1517	1473	1620 1387 1395
686	1560	1536	1517	1507	1542	1387 1385 1532

687 1536 1528 1507 1525 1469 1385 1526 1401
 688 1528 1534 1525 1515 1467 1526 1383 1399
 689 1534 1562 1515 1509 1540 1383 1379 1530
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 691 1589 1656 1595 1519 1475 1618 1389 1397
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 707 1662 1642 1682 1658 1654 1674 1646 1678
 708 1642 1600 1658 1591 1636 1646 1604 1477

END

-27 -1 -1 1 * EXCITATION POTENCIAL.
 -1 1 1 * ELECTRODE AT V=0.
 -27 34 1 S * HOLDING ROTATIONAL DOF.
 -20 34 1 S * HOLDING ROTATIONAL DOF.
 -1 34 1 S * HOLDING ROTATIONAL DOF.

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